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How To Stretch Your Software

Using Data Banks As A Business Tool

The Fourth R: Computer Literacy

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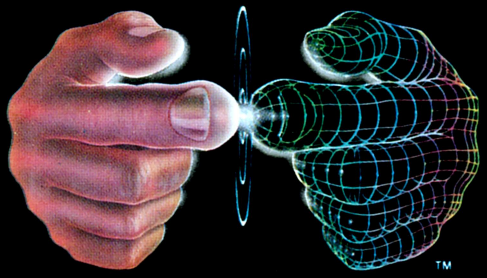

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CIRCLE 2

May 1983
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PERSONAL COMPUTING

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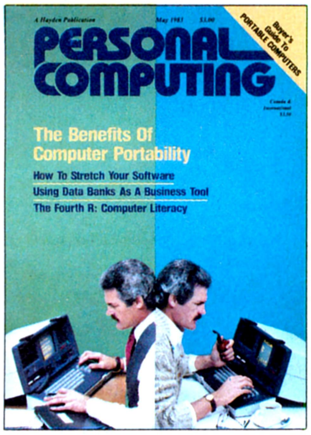
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PERSONAL COMPUTING
Buyer's Guide To Portable Computers
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How To Stretch Your Software
Using Data Banks As A Business Tool
The Fourth R: Computer Literacy

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GEORGE B. FRY III

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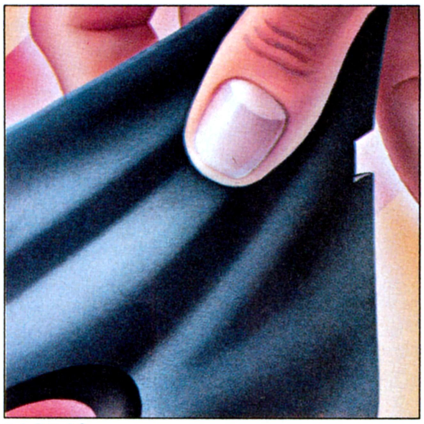

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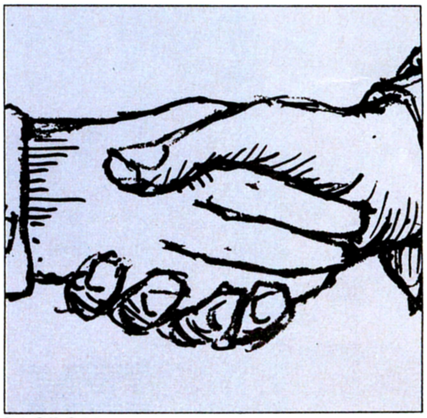

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FROM THE EDITOR

Where Is Computing Going?

We get a lot of questions here at *Personal Computing*, and perhaps the most frequent one—in one form or another—is represented in the title above.

Just where is personal computing going? The answer, if one thinks in terms of mobility, seems to be "everywhere." Charles Rubin, who wrote our cover story, "Portable Power," beginning on page 87, tells of a consultant who takes the computer to the client, a manufacturer's representative who takes her computer with her on the road, a marketer who carries his back and forth between home, office, and client presentations, a foreign correspondent who lugs his all over the world, and a lawyer who takes his to court.

To keep the context under control, by the way, we're defining portable computers here as programmable systems capable of full computing functions, capable of utilizing peripherals, and small enough to be closed up in one package and placed under an airplane seat.

There are two keys to portability—size (smaller) and power (greater). Manufacturers are packing more power into less space than ever before. Senior Editor David Gabel and Editorial Researcher Bette Schwartzberg have focused on the current state of the portable art in "Buyer's Guide to Portable and Hand-Held Computers," beginning on page 96. One might look at the trend toward big power in small packages and conclude that movement will continue in both directions.

It may not be quite that simple, however, as Senior Editor Michael Rogers learned when he visited Adam Osborne, Chairman of The Osborne Computer Corporation and father of the first portable computer, the Osborne.

In his interview, beginning on page 201, Rogers found Osborne adding other dimensions to the larger and smaller directions in which computing is moving.

Osborne sees trends towards specialization, particularly in the home. He also sees risks to society through personal computing—particularly as individuals are able to access and manipulate mainframe data bases of large institutions such as banks.

As for us, we think the strength of computing in the future lies in the incredible undeveloped capacity of the personal computer to lever the power of individual human minds. Tapping this power for good, we believe, requires greater understanding of the distinctions between personal use and institutional use—a thought developed in "The Future of Computing: Personal With a Capital P," beginning on page 211.

So, where is computing going? That's hard to say with any precision; there are so many aspects, so many ways of looking at it. The era of personal-computing power has barely begun. No one knows exactly where it will lead. But we're optimistic by nature and therefore convinced that as individual human minds get cracking at the problems that beset us those problems will be solved.

Paul Kellam

Inside Apple

Apple Computer Inc., 20525 Mariani Avenue, Cupertino, California 95014 Vol. 1 No. 2
For the authorized Apple dealer nearest you, call 800-538-9696 (800-662-9238 in California.)

Fruitful Connections.

There are more people in more places making more accessories and peripherals for Apples than for any other personal computer in the world.

Thanks to those people—in hundreds of independent companies—you can make the humblest 1978 Apple II turn tricks that are still on IBM's Wish List for 1984.

But now we're coming out with our very own line of peripherals and accessories for Apple® Personal Computers.

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First, compatibility. We've created a totally kluge-free family of products designed to take full advantage of all the advantages built into every Apple.

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Now the same kindly dealer who keeps your Apple PC in the pink can do the same competent job for your Apple hard-disk and your Apple daisywheel printer.

So if you're looking to expand the capabilities of your Apple II or III, remember:

Now you can add Apples to Apples.

Gutenberg would be proud.

Old Faithful Silentype® has now been joined by New Faithfuls, the Apple Dot Matrix Printer and the Apple Letter Quality Printer.

So now, whatever your budget and your needs, you can hook your Apple to a printer that's specifically designed to take advantage of all the features built into your Apple. With no compromises.

The 7x9 Apple Dot Matrix Printer is redefining "correspondence quality" with exceptional legibility. With 144x160 dots per square inch, it can also create high resolution graphics.

The Apple Letter Quality Printer, which gets the words out about 33% faster than other daisywheel printers in its price range, also offers graphics capabilities. See your authorized Apple dealer for more information and demonstrations. Because, unfortunately, all the news fit to print simply doesn't fit.

A joy to behold.

The new Apple Joystick II is the ultimate hand control device for the Apple II.

Why is it such a joy to use?

With two firing buttons, it's the first ambidextrous joystick—just as comfortable for lefties as righties.

Of course, it gives you 360° cursor control (not just 8-way like some game-oriented devices) and full X/Y coordinate control.

And the Joystick II contains high-quality components and switches tested to over 1,000,000 life cycles.

Which makes it a thing of beauty. And a joystick forever.

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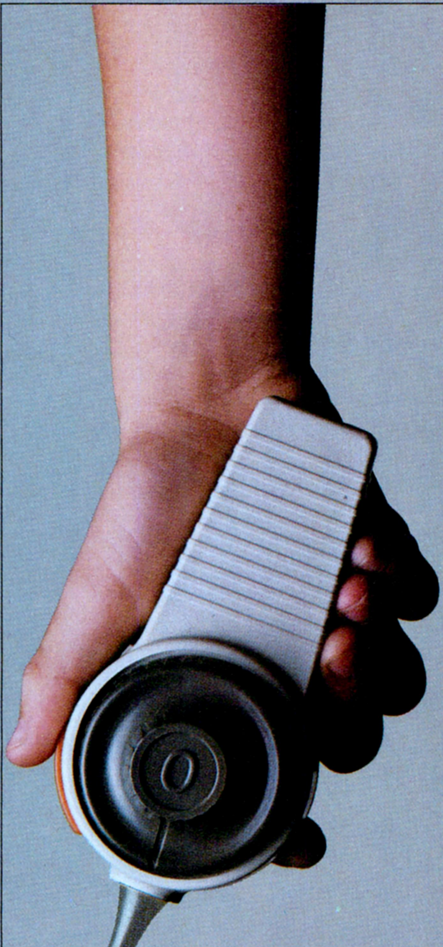

Up the creek without a paddle?

Or lost in space? Or down in the dungeons?

Whatever your games, you'll be happy to know that someone has finally come out with game paddles built to hold up under blistering fire. Without giving you blisters.

Apple Hand Controller II game paddles were designed with one recent discovery in mind:

People playing games get excited and can squeeze very, very hard.

So we made the cases extra rugged. We used switches tested to 3,000,000 life cycles. We shaped them for holding hands and placed the firing button on the right rear side for maximum comfort.

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A storehouse of knowledge.

If you work with so much data or so many programs that you find yourself shuffling diskettes constantly, you should take a look at Apple's ProFile,™ the personal mass storage system for the Apple III Personal Computer.

This Winchester-based 5-megabyte hard disk can handle as much data as 35 floppies. Even more important for some, it can access that data about 10-times faster than a standard floppy drive.

So now your Apple III can handle jobs once reserved for computers costing thousands more.

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Apple.

monitor ///
profile
apple ///

Launching pad for numeric data.

Good tidings for crunchers of numerous numbers:

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The Apple Numeric Keypad II has a standard calculator-style layout. Appropriate, because unlike some other keypads, it can actually function as a calculator.

The four function keys to the left of the numeric pad should be of special interest to people who use VisiCalc.® Because they let you zip around your work sheet more easily than ever, adding and deleting entries.

With one hand tied behind your back.

CIRCLE 43

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More Apple II owners choose Hayes Micromodem II than any other modem in the world. Compare these features before you buy. You should. It's your money. Thousands of other Apple II owners have already compared, considered, and are now communicating – all over the U.S.A. – with Micromodem II. The best modem for the Apple II. The most modem for your money.

A complete data communication system. Micromodem II is not "base priced" plus necessary "options." It's a complete, high-performance data communication system. The printed circuit board fits – quickly and easily – into your Apple II, eliminating the need for a serial interface card. And the Microcoupler™ (included) connects the Apple II directly to a standard modular telephone jack. Auto-dial and -answer features are built in. Operation can be full or half duplex, with a transmission rate of 300 bps. And it's Bell 103 compatible and FCC approved.

Microcoupler
MICROMODEM II
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Hayes

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And because it's menu driven, you can choose from a wide variety of options to set your communication parameters – as well as change hardware configuration – directly from the keyboard. It even allows you to generate ASCII characters that are normally not available from Apple keyboards, further extending your capabilities. Incoming data can be printed (on serial or parallel printers) as it's displayed on your screen.

Micromodem II is available with or without the Terminal Program. Buy your modem by itself, or optionally packaged with the Terminal Program disk and user manual at extra cost. The software is also sold separately, for those who already own a Micromodem II.

If you're ready to communicate with other computers, to access information utilities, time-sharing systems, or use bulletin boards, then you're ready for Micromodem II. Come on. Compare. Consider. Then buy.

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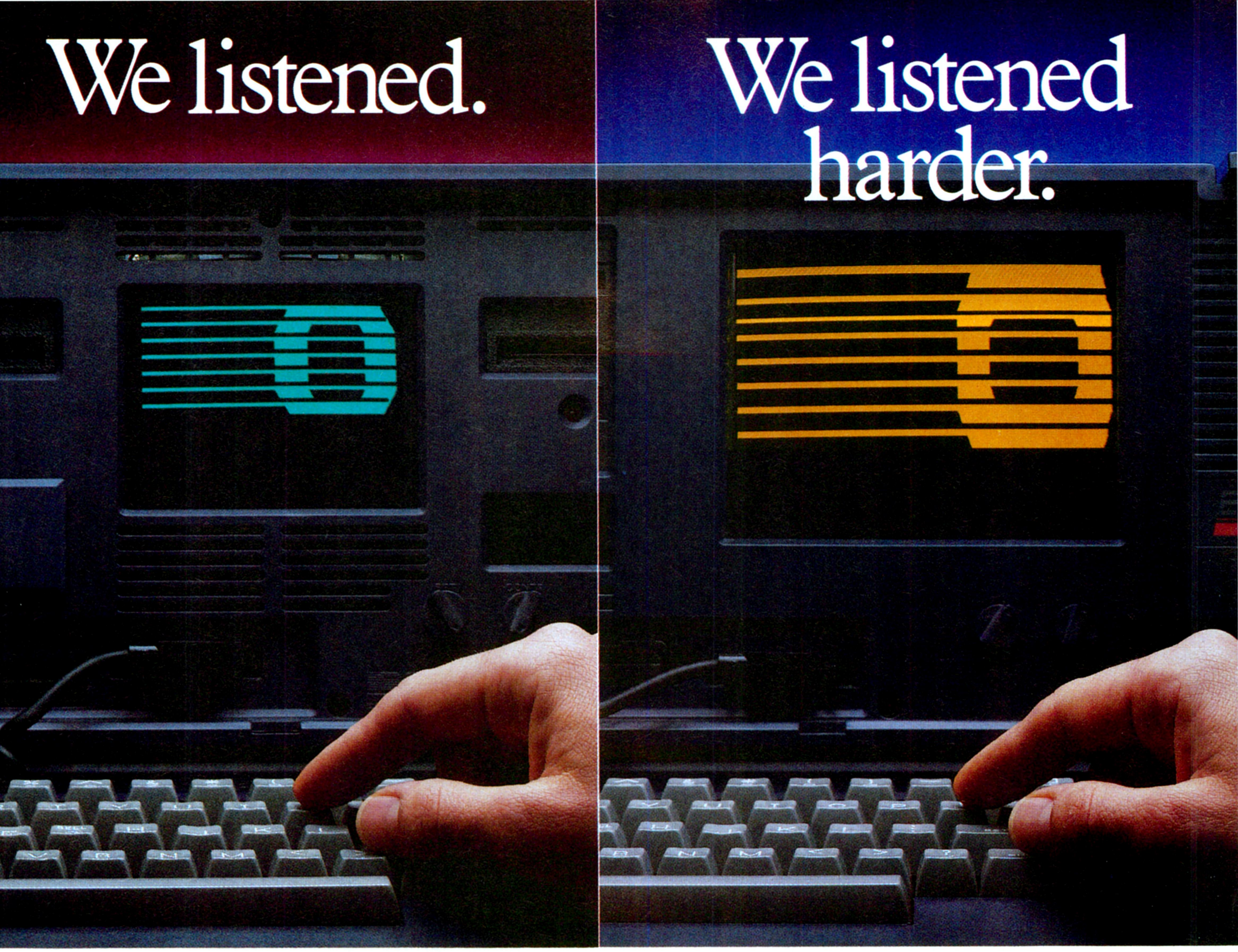

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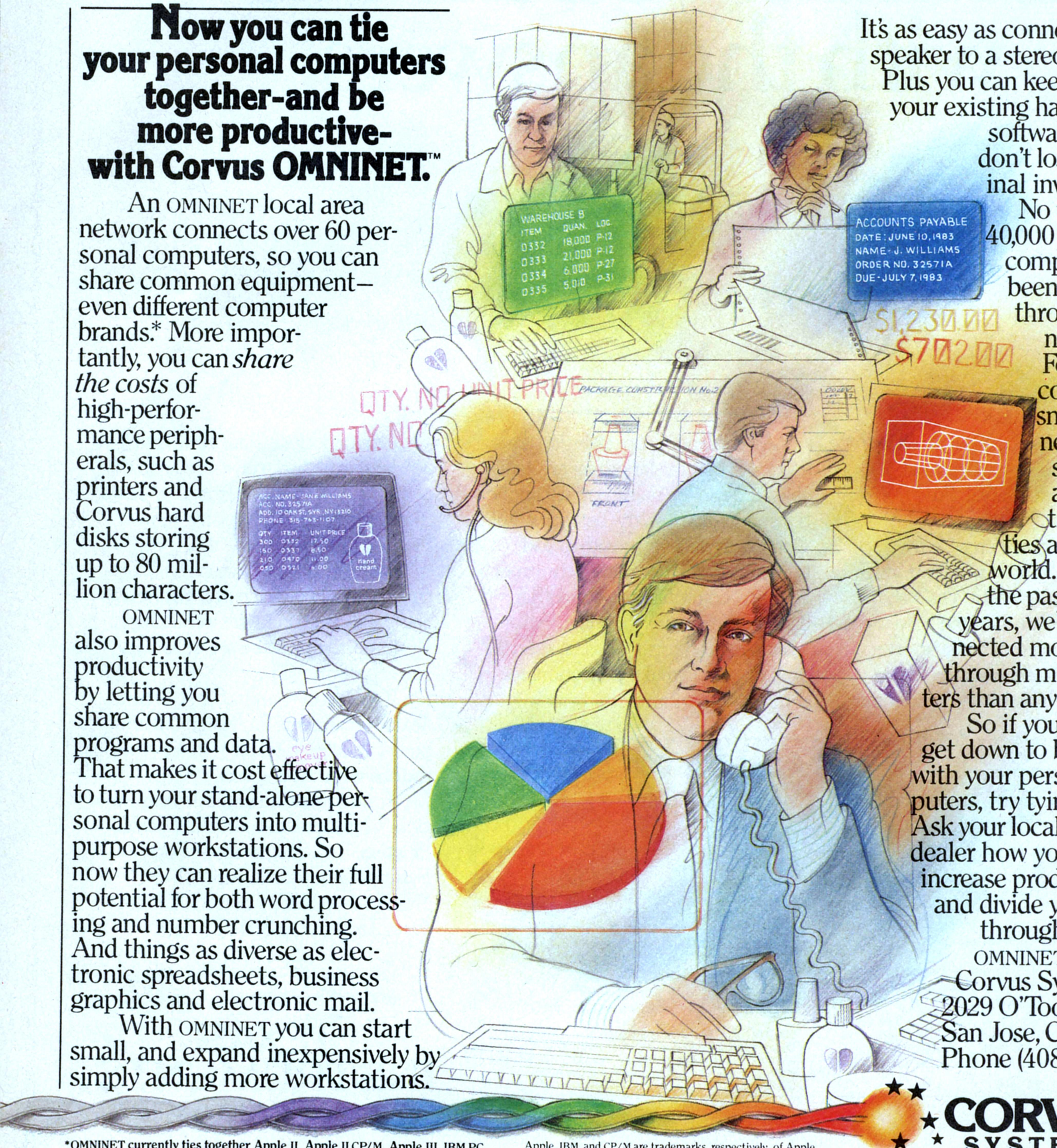

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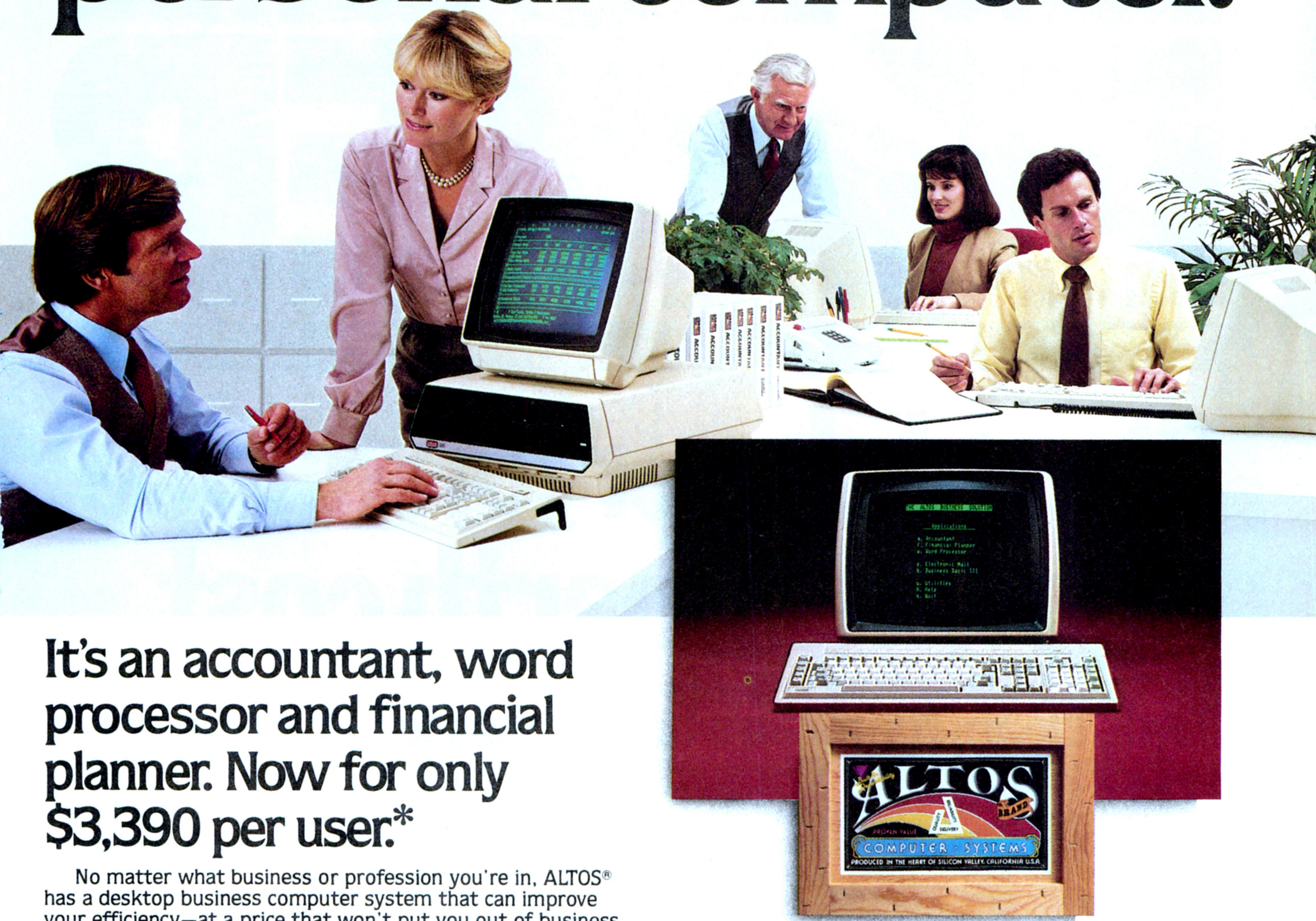

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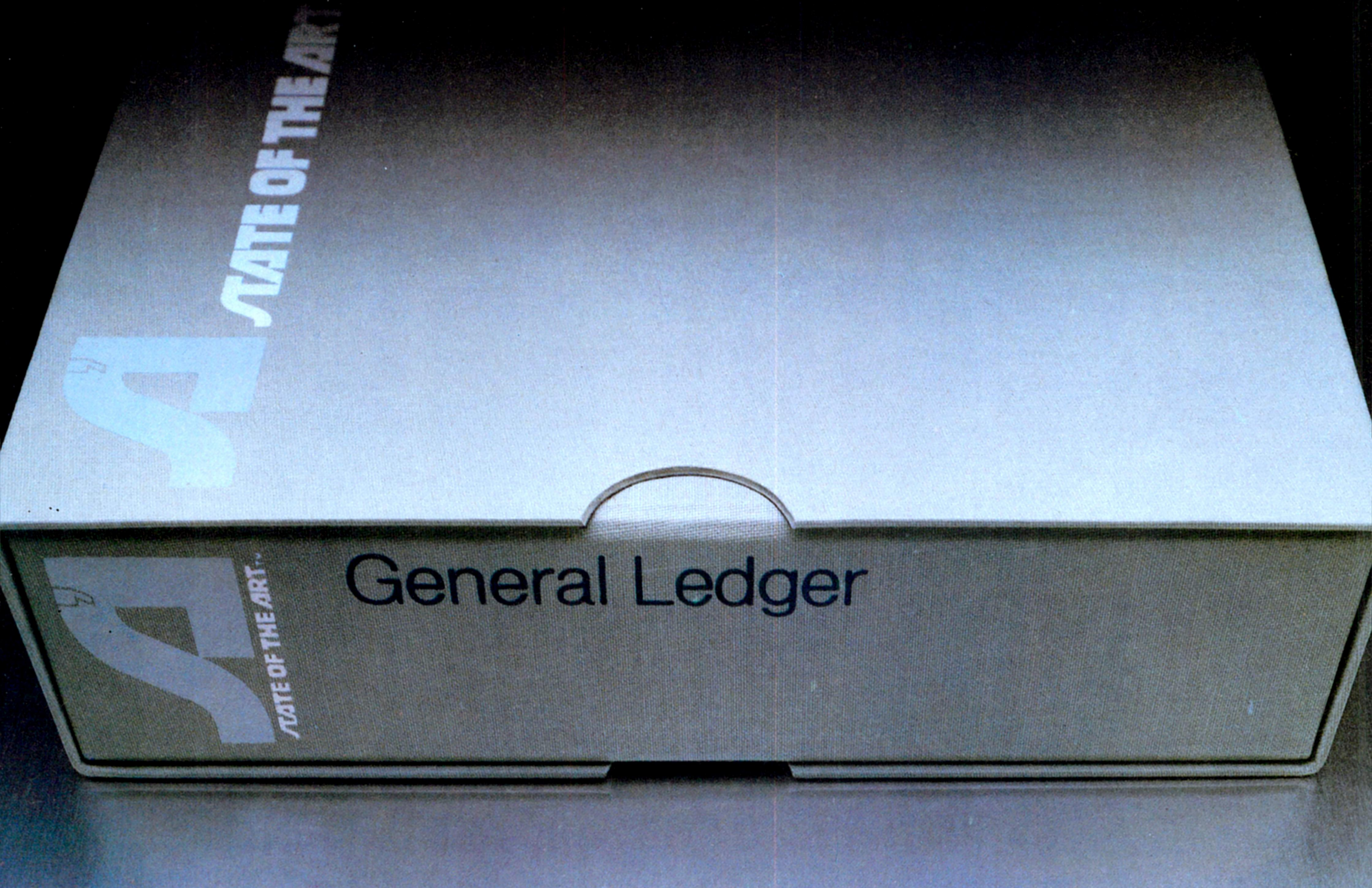

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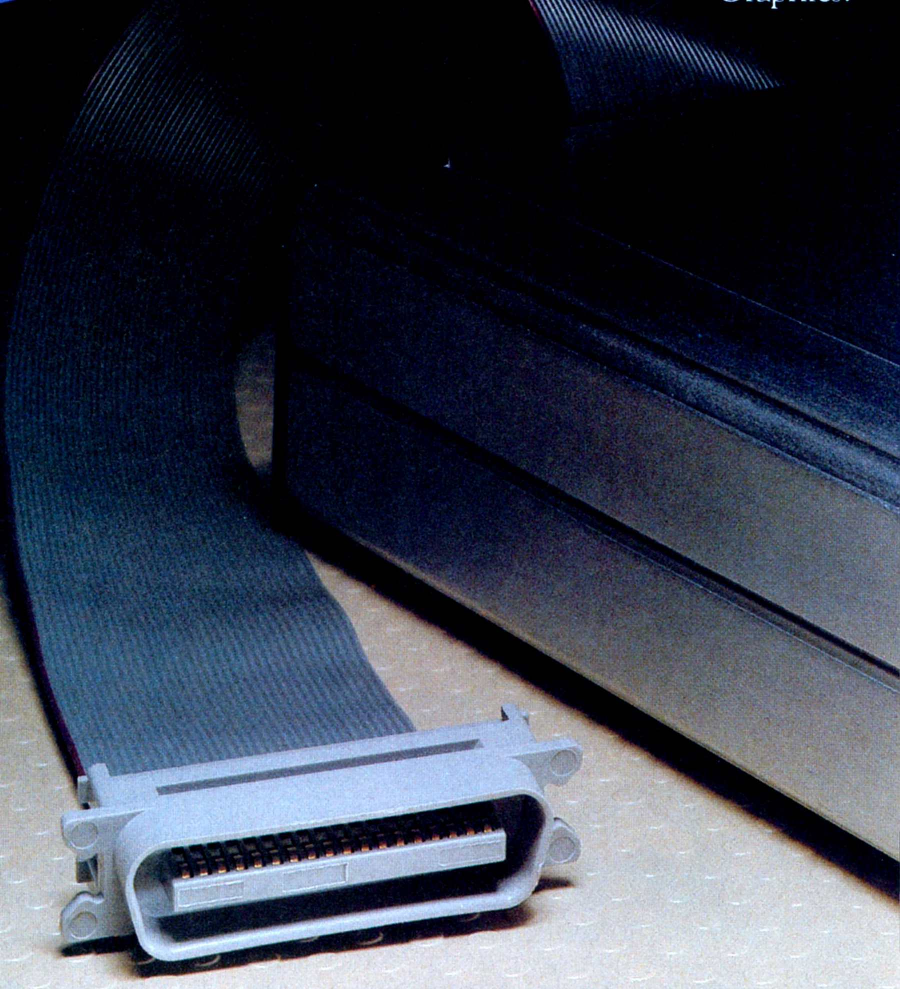

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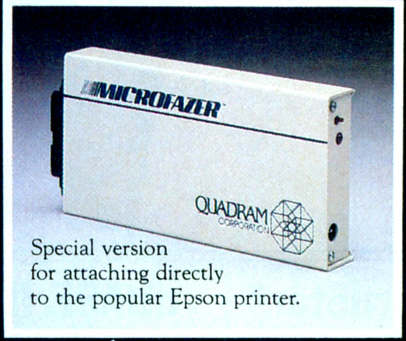
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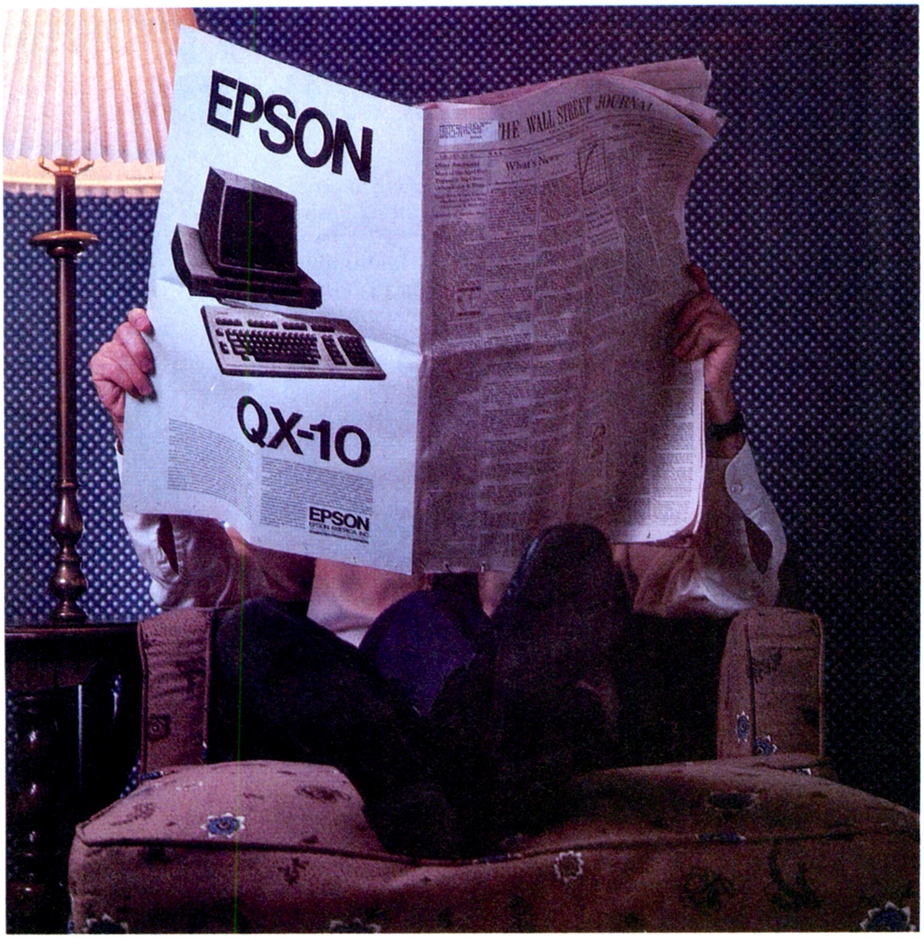

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CIRCLE 11

Will Easy Computing Make Languages Obsolete?

In this monthly column "Answers" we will respond to your most frequently asked general questions about personal computing. Please send your questions to: Answers, Personal Computing, *50 Essex St., Rochelle Park, NJ 07662.*

Q: In the February 1983 issue of *Personal Computing*, you had an article called "A New Generation Arrives" that dealt with recent computer advances. You said an era of easy computing, where more efficiency is achieved with little cost in time and effort, is finally upon us. Does this mean that complicated programming languages like FORTRAN and COBOL will become obsolete?

A: Not at all. What it does mean is that people who want to use the computer as a tool will, in all probability, have less reason to learn those languages.

Here's the way it works. New hardware coming into the field has terrific capabilities compared with what was available just two years ago. Specifically, the low-cost 16-bit microprocessor can address 1 Mbyte of memory directly, compared with the 64k maximum of the 8-bit devices. While you might never be able to conceive of an application requiring that much storage, you would probably not be thinking of all the possibilities. If you want to make a computer program really easy to use, you need to put in a lot of instructions that take the thinking away from the user.

Take the mouse, for example. This small, screen-pointing device allows you to "pick" items from an on-screen menu simply by "pointing" to the item and pressing a button. You don't have to think about the computer at all. Just point to what you want.

That's great, but it means that somehow the computer has to understand what you're doing with the mouse. The computer has to have a program somewhere that can "read" the position of the mouse on the table top, translate the real position of the mouse into a virtual position relative to the screen display, and move the cursor to the virtual position on the screen that corresponds to the real position of the mouse.

Not only that, but the mouse-driver program also has to check constantly to see if one of the control buttons has been pushed, and it has to know what the user wants to do when he pushes a button.

The mouse driver resides in memory, which means that a computer using a mouse as an input device needs more memory than one without a mouse.

The particular computer we talked about in that article, the LISA from Apple, also has a complex on-screen display. It can put many different displays onto the same screen, and the only way it can do that is to have the different information available to be shown at a moment's notice. It also needs a program to decide what to display and what not to display. The information and program take a lot of memory.

While the easy computers that are coming along need lots of memory and lots of programming to make them easy, you won't have to program them to get your job done.

But someone has to program them. LISA was programmed by the Apple engineers who worked on the project. They did it in Pascal, a complicated programming language more sophisticated than either FORTRAN or COBOL. The integrated software packages, like The MBA from Context Management and 1-2-3 from Lotus Development, were programmed in complicated programming languages.

What if you want your computer to do something that no one's written a program for? Say you want it to listen for a baby's cry in another room, and ring a telephone if that cry is detected. You'll have to program it to do those things, and you'll need a programming language to do it. The complicated ones, like FORTRAN, COBOL, and Pascal, are a lot easier to program than the simple ones, like BASIC and assembly language. But it doesn't look like the languages will go away. It does look like the average user will do less programming as the systems improve.

Q: I've seen a lot of articles that divide software into three categories: software for Apples, CP/M software, and other. I understand what machines are in the Apple group, but what common personal computers are in the CP/M and other categories? The software for one group doesn't seem to be applicable to the other two groups. How do you know what group a particular program is for? Finally, is any one group inherently superior to any other?

A: Common CP/M machines include the Osborne 1, the Kaypro computer, many of Cromemco's machines, and others. In addition, many machines can be retrofitted to run CP/M, or you can get CP/M as a simple software package. The Commodore 64 and the Apple II can be retrofitted (just plug in a card), and

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the IBM Personal Computer has an optional CP/M-86 operating system.

Other computers include the Commodore machines, the Atari computers, Texas Instruments's computers, Radio Shack's computers which run an operating system called TRS-DOS, and, of course, all the 16-bit computers that run MS-DOS as does the IBM Personal Computer.

When you buy a software package, you can tell which computer it runs on because the packages are clearly labeled as to the type of machine, the memory required, and any peripherals required or recommended for the package.

Finally, no one group of packages is inherently superior. Software is written for a particular computer to do a particular job. The interesting thing about the groups is that there are a lot of software packages for the Apple, Radio Shack, and for computers which run on the CP/M operating system. For the other computers, the choice is more limited. This will change rapidly in the case of the IBM Personal Computer, for which there is already a wealth of good software, and the Commodore 64, for which software is appearing very quickly.

Q: I had almost decided on a TI 99/4 computer as the one requiring low initial investment, yet providing expansion capability. Then, checking computer magazines showed that other makes, like the Radio Shack TRS-80 and the Atari 400 and 800, are mentioned more often. Why is the 99/4 so neglected?

A: When Texas Instruments first introduced the TI 99/4, it made several moves that industry watchers considered unwise. The machine had a membrane keyboard that was difficult to use. It didn't allow much programming. It had little expansion capability. Finally, the computer wasn't marketed aggressively, so people didn't know what it could do. All this changed several months ago with the introduction of the 99/4A, an upgrade of the original.

With the development of the new product, an aggressive marketing push including a national advertising campaign, introduction of the expansion chassis, and a lot of software for the computer, magazines will probably start paying more attention to this machine.

Q: What's the IEEE-488 interface, and why is it used?

A: The IEEE-488 interface is a way to get signals onto the IEEE-488 bus, which is a standard signal bus for computers and automatic electronic instruments. The standard, which was adopted by the Institute of Electrical and Electronics Engineers, a professional organization, was first advanced as a way of interconnecting computers and instruments the computers would control. It's handy for running electronic experiments that go on for hours or days. Most firms conduct such tests on new products to establish their reliability. It also helps to have the bus available if you want to put your measuring instrument in a place that's difficult to get to, or dangerous, like inside the crater of Mt. St. Helens.

But that's not the only use for the 488 bus, as it's called. Commodore put it into its computers early on, and still uses it to hook up common peripherals, like printers and disk drives, to its CBM computers. Osborne has a 488 interface on its Osborne 1 which you can use to hook up parallel printers. Many Hewlett-Packard computers have 488 interfaces. Hewlett-Packard calls its 488 interface the HPIB (Hewlett-Packard Interface Bus) because that's what it called the interface when HP used it before the IEEE adopted it as a standard.

One nice thing about the 488 interface as opposed to the RS-232-C interface, or the Centronics parallel interface, is its ability to address different devices on the bus. For example, you could conceivably have a printer and a modem hooked onto the same computer port, and send data to one or the other by manipulating software switches. We don't know of anyone who's done that, but we're fairly sure it's been done somewhere in an engineering lab. You can also have two different generic devices on the bus—"talkers" and "listeners." Talkers do only that—send data out onto the bus. Listeners wait until a bunch of data comes their way and then capture it if they "heard" their address with the data package. They then do whatever they're supposed to, depending on the instructions included in the data they just heard. Talker/listeners do both. A computer controlling a network of remote devices, seismometers, tilt meters, and the like, is a talker/listener. It can instruct the devices on the bus, and gather data those devices send back.

You can see that all this takes programming to make it work. The computers that have the 488 interface built in have software to make their standard peripherals operate on the bus. If you wanted to do something else, you'd have to configure your port-driver routines to handle the other function. But the possibilities seem endless.

Q: The subject of running the CP/M operating system on the Commodore 64 is still a mystery to most users because the Z80 boards for the 64 are just beginning to become available. Shouldn't the availability of CP/M also influence the decision of disk drive for the computer? I believe the CP/M standard format is the 8-inch floppy disk, while Commodore seems to be pushing the Model 1541 5¼-inch drive.

A: CP/M is software, and as such doesn't need any particular disk size for its operation. While it's true that many programs for CP/M

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do come on the larger disks, they don't have to. Osborne computers use CP/M. All the CP/M software that runs on Osborne machines is supplied on the 5¼-inch disks, because that's the size of the disk drives that come with the Osbornes.

So you can get the smaller drives for the Commodore, and get CP/M on the smaller disk drives. At first, you may find that CP/M programs formatted specifically for the Commodore 64 are a bit rare, because the computer is so new. So while the operating system on 5¼-inch floppy disks is available, it might need specific tailoring to make it work on the 64. There are utility programs in CP/M to handle this chore, although it may be a bit difficult, as we found out in configuring the Osborne's CP/M system to run with a Spinwriter printer. But it turns out that if you have almost any unusual combination of hardware you'll have to configure CP/M to recognize it, so the 64 shouldn't be different from any other computer in this regard.

Q: I can combine a Scott amplifier, a Fisher tuner, a Garrard turntable, a Panasonic tape recorder, and Radio Shack speakers, and have an acceptable stereo system. I can put a Buick 455-4 engine in a Ford by using an engine-to-transmission adaptor housing. Can I do the same thing with computer hardware and software? How many computer and software brands are compatible?

A: It may not be immediately obvious, but there's a lot of compatibility in the computer business, which has come about through the adoption of interconnect standards, just as it did in the audio and automotive fields.

First of all, most software publishers make their software available in a variety of formats for different computers. Thus, you'll find VisiCalc, to name just one, available on almost every computer with enough memory to run the program in the first place. Another example is dBASE II. It's available in a CP/M version for computers that run that operating system, a version for the IBM Personal Computer, and a version for the Apple II with a CP/M card. So the bottom line here is that a lot of software cuts across a number of hardware manufacturers' product lines. This isn't always true, because some machines have different capabilities from others. But you can always play a mono record on a stereo system, too. It's just that the performance won't be quite as good. The same can be said of software. If a package is designed to support a color display, and you have a black and white monitor, you can use the software, but you'll miss out on the color.

Hardware compatibility is another matter. But even here, a great degree of compatibility exists. We just had the enlightening experience of having to hook up an NEC 7710 Spinwriter to two different computers—an Osborne 1 and an Apple II Plus. We'd like to be able to say it was a simple task in both cases, but it wasn't. We got the Apple connection going first, using a California Computer Systems serial I/O (input/output) card. We had to set the baud rate (the data-transmission speed) on both the card and the Spinwriter, and make sure the connection was OK. Then we tested the operation using a word processor, and found that for this configuration we needed to send some characters to the printer to make it line feed properly.

The Osborne was something else again, because we had to get into its CP/M operating system to make sure everything was set up right. Somehow we got mixed up in the documentation and couldn't figure out just how to set up the system, so we kept getting garbage on the printer. Finally, we started to throw software switches in desperation, and one combination we should have thought of in the the beginning worked. We had to tell the computer that we had a 5510 Spinwriter connected to it, and it worked just great with the 7710.

The point here isn't the difficulty we had, nor is it the elation we felt when the combination finally worked. The point is that the compatibility between this printer and two very different computers exists.

The same holds true for disk drives, monitors, plotters, add-in memory, modems, terminals—you name it. Manufacturers of these devices make them with interconnect standards which allow you to connect them to almost any computer. The only thing you need to do is read the instruction manuals to see how the computer and the peripheral are connected.

You're likely to run into snags as we did. But we remember very well the time we put a '72 VW Beetle transaxle into a '58 Karmann-Ghia. We wound up welding a bracket together that would account for the different clearances on the old body and the new transmission. We just had to fiddle a little bit.

Q: I have heard from others, and I know from my own experience, that computer disk drives have to be adjusted twice a year. I have also learned that this is going to cost about $40 an hour. This is ridiculous! I can not afford to do this to both of my drives. Is there a cheaper way, such as doing it myself? Will hobbyists ever escape from this type of computer-store monopoly?

A: Electronics technicians are expensive these days. They have to be paid what they're worth, and the computer store has to charge you for the use of its services. If you think that charge is bad, try getting your car fixed at the dealer's service department.

That doesn't take away the pain, though. We suggest you shop around. If your dealer charges what seems to you an outrageous figure, then try

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others. See if you can get a price for the job on a flat rate, rather than an hourly figure. The flat-rate price might turn out to be OK.

There might be another alternative. Maybe you can get a maintenance contract on the drives alone that will prove more affordable. One advantage with such a service is that you'd be covered in case of a catastrophe.

We do not recommend that you try to service your drives yourself. If you decide to adjust the drives yourself, you could set them up so they don't read your disks, or worse, they might damage your disks and you'd have to lug the drives to the computer dealer anyway.

Q: I need to use both a dot-matrix and a letter-quality printer with my Apple computer. I've heard you can save money (and expansion slots) by getting a single printer interface card that can drive both printers. Is this true?

A: Mountain Computer, Videx, and SSM are some of the firms that make multifunction cards like the one you described. They have a serial output (suitable for a letter-quality printer) and a parallel output (suitable for a dot-matrix printer). Besides conserving slots and dollars, they also draw less current from the power supply.

When you install the interface card, its configuration program asks you to assign the different interface card outputs to the expansion slots of your choice. Say your interface card is in slot 1. You could assign the parallel output to slot 1 also. Then you could have the serial output emanate from slot 4, even though the card itself stays in slot 1. You might even have a different card in slot 4, though that can get tricky. When you assign a function to a slot the card doesn't occupy, it's called "phantom" slot assignment.

You do have to get two copies of your word-processing software, one configured to output printing through slot 1, the other through slot 4, as per our example.

Q: What are the odds that a computer, printer, and disk drive will still be in operating condition if I order them by mail and then UPS dropkicks them across the country?

A: UPS's parcel handling aside, the odds are pretty good that hardware in its original packing will survive the shipping ordeal. The mail-order houses we asked said shipping damage was "not a major problem" for them. It makes more sense for manufacturers to spend a little extra on foam rubber or Styrofoam than to spend a lot replacing or repairing damaged merchandise. This is, by the way, an excellent reason for customers to keep the original packing their equipment arrives in. If you ever need to mail it yourself, for service or other reasons, that factory-engineered packing is your equipment's best chance for survival.

Q: Does anyone make a disk drive for Commodore computers besides Commodore?

A: As far as we can determine, if you want a disk drive for the VIC-20 or the 64, you'll have to buy it from Commodore. In part, this is due to the fact that Commodore uses an unusual bus for connecting peripherals, and other manufacturers would have to go to considerable lengths to produce a Commodore-compatible disk drive. There is one lower-priced alternative to the Commodore disk drive you might consider: the Exatron ESF-2064 Stringy Floppy System (Exatron, 181 Commercial St., Sunnyvale, CA 94086). This system, which costs less than $200, stores data on tiny endless loop tape cartridges, and is a good compromise between tape cassettes and disk drives.

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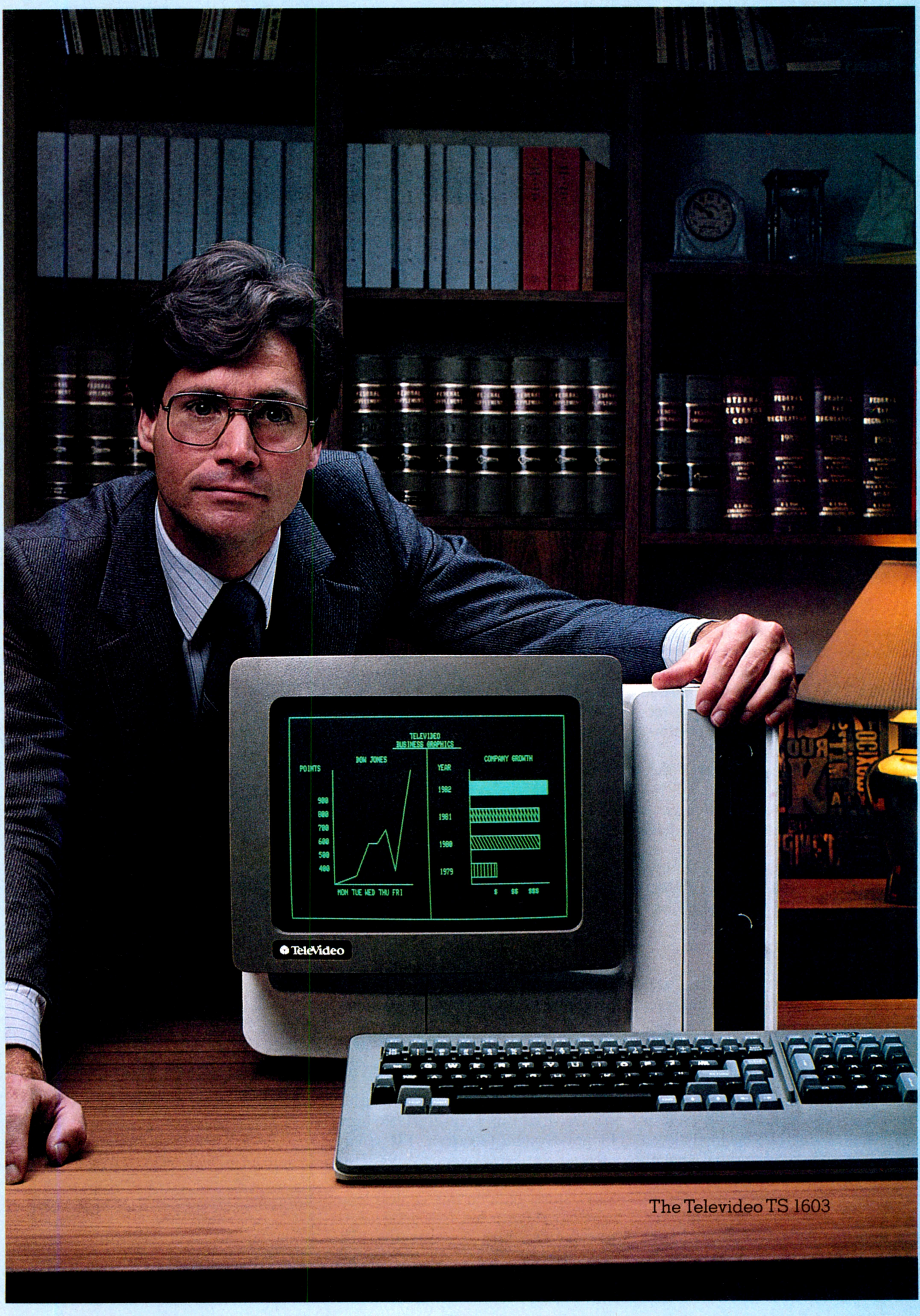
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The Televideo TS 1603

"I chose TeleVideo's Personal Computer for all the things IBM left out."

I didn't choose TeleVideo because it's $1,000 less than IBM.* It was because TeleVideo thought of everything.

To begin with, my TeleVideo has twice as much storage capacity as IBM, even with the extra cost IBM disk drive. I can use that extra capacity.

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Another thing I like. TeleVideo's keyboard is so lightweight and comfortable my fingers hardly know they're working. IBM's keyboard? It's a little behind the times.

TeleVideo also gave me the choice of popular CP/M® or MS-DOS® operating systems—FREE—so I can pick from thousands of proven software programs. You can get the same option from IBM, but you have to pay for the privilege.

Last but not least, TeleVideo's network capabilities give me a real growth path for the future, linking up to sixteen computers in one powerful network. You can't get that from IBM.

So before you choose any personal computer, do like I did and compare. You'll see that TeleVideo gives you a lot more computer for a lot less money. And you'll buy TeleVideo because they didn't leave anything out.

For more information, write TeleVideo Systems, Inc., 1170 Morse Ave., Sunnyvale, CA 94086, call toll-free 800-538-1780 (In California call 800-672-3470 Ext. 945), call one of our authorized distributors or dealers, or contact one of our regional sales offices, listed below.

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CIRCLE 15

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We just made owning an Atari computer a lot more logical.

RanaSystems 1000
12
POWER
BUSY
PROTECT
UNIT ID
TRACK
ERROR
DENSITY

Introducing the Rana 1000 disk drive. It's a whole new game for Atari computers.

RanaSystems 1000
12
POWER
BUSY

This two digit LED readout displays a code that tells you everything you need to know.

This beeping button tells you your write protect feature is keeping your information safe.

The remaining buttons beep when touched, and provide readouts on density storage, error status, and drive number.

This button beeps when you touch it, and the LED readout tells you what track you're on.

When Rana Systems introduced the Elite Series of Apple® compatible disk drives, we didn't know what a tremendous impact they would make. It turned out to be a line so outstanding in performance, styling, capacity, and price, that it instantaneously made us a major force in the market. Well, needless to say, the response was so great that we were forced to create the same highly advanced disk drive for Atari.® A disk drive that when coupled with Atari's computer, could perform everything from accounting, financial planning, and stock charting, to word processing, business management, and letting you write your own programs. Plus, we made it simple enough for a child to use, for learning anything from the alphabet to a foreign language.

Working with a diskette versus playing with a cassette.

Let's face it. The only reason Atari made a cassette option to their computer was to make it affordable. But now you don't have to settle for less. Because now you can get a diskette for your Atari computer which outperforms their cassette and costs ⅓ less than their disk drive. With Atari's cassette you only get half the functions of a computer compared to what our floppy disk can give you. Their cassette is not only limited in the software available, but it also takes 20 times longer to get the information you need. And Rana's disk drive offers twice the storage capacity of either their cassette or disk drive.

Why even stylewise our new low profile design not only looks 100 times more spectacular, but it occupies 3 times less space. And our new Rana 1000 also gives you a piece of its mind every time you use it, because our disk drive gives you information as well as takes it. And we think that says a lot.

The disk drive that has all the answers.

Rana offers you a myriad of features Atari couldn't even conceive of. Like five electronic functions on the front panel that actually beep and give you a LED readout when touched. Our disk drive tells you what track you're on, and what density and how much information you're storing. It lets you switch from a single density of 90,000 letters to a double density of 180,000 letters, on a single diskette. And, we have a write protect feature which protects your diskette from being erased. In fact, no other disk drive can offer you that.

As you can see, it was easy to build a disk drive superior to Atari's. Because for every reason you buy a disk drive, Rana has superior technology.

The Rana 1000 disk drive. It brings your Atari computer to a higher level of sophistication for a price one third lower than Atari's. So your choice shouldn't even be a matter of logic.

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CIRCLE 44

YOU WILL NEVER AGAIN HAVE TO WASTE TIME WAITING FOR YOUR PRINTER.

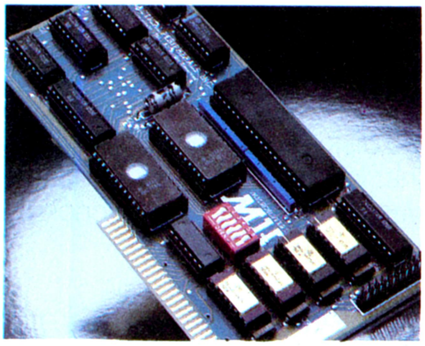
MICROBUFFER™ ALLOWS YOU TO PRINT AND PROCESS SIMULTANEOUSLY.

Microbuffer will instantly increase your efficiency — and eliminate the frustration of waiting for your slowpoke printer.

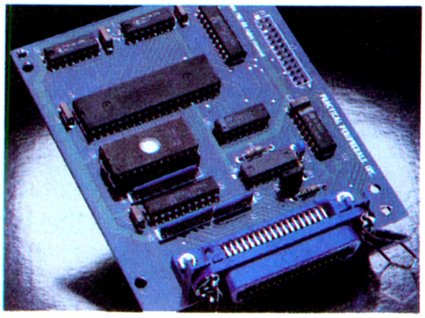
Now you can simply dump your printing data directly to Microbuffer and *continue processing*. Microbuffer accepts the data as fast as your computer can send. It stores the data in its own memory buffer, then takes control of your printer.

THERE IS A MICROBUFFER FOR ANY COMPUTER/PRINTER COMBINATION.

Whatever your system, there is a specific Microbuffer designed to accommodate it.



FOR APPLE II COMPUTERS, Microbuffer II features on-board firmware for text formatting and advanced graphics dump routines. Both serial and parallel versions have a power-efficient low-consumption design. Special functions include Basic listing formatter, self-test, buffer zap, and transparent and maintain modes. The 16K model is priced at $259 and the 32K, at $299.



FOR EPSON PRINTERS, Microbuffer/E comes in two serial versions — 8K or 16K (upgradable to 32K) — and two parallel versions — 16K or 32K (upgradable to 64K). The serial buffer supports both hardware handshaking and XON-XOFF software handshaking at baud rates up to 19,200. Both interfaces are compatible with standard Epson commands, including GRAFTRAX-80 and GRAFTRAX-80+. Prices range from $159 to $279.

CLEAR
COPY
PAUSE
POWER
MICROBUFFER

ALL OTHER COMPUTER/PRINTER COMBINATIONS are served by the stand-alone Microbuffer In-line.

The serial stand-alone will support different input and output baud rates and different handshake protocol. Both serial and parallel versions are available in a 32K model at $299 or 64K for $349. Either can be user-upgraded to a total of 256K with 64K add-ons — just $179 each.

SIMPLE TO INSTALL.

Microbuffer II is slot-independent. It slips directly inside the Apple II in any slot except zero.

Microbuffer/E mounts easily inside the existing auxiliary slot directly inside the Epson printer.

The stand-alone Microbuffer is installed in-line between virtually any computer and any printer.

MICROBUFFER FROM PRACTICAL PERIPHERALS.

So what are you waiting for? Write to us for more information or ask your dealer for a demonstration.

When you see how much freedom Microbuffer will allow, you'll understand why it's so silly to be without one.

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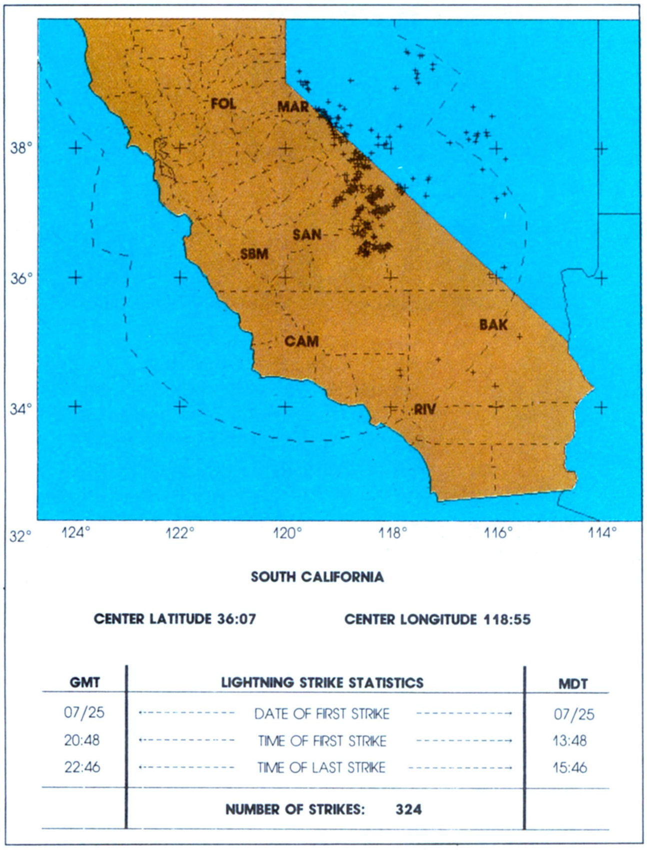
CIRCLE 108

Fire-Fighting System Saves Valuable Timberland

Every year, hundreds of acres of national parkland and industrial timberland are destroyed by fire. The cost to the American public is reflected in the loss of natural beauty and in the rising cost of wood products.

In an attempt to reduce the incidence and scale of these devastating fires, the federal Bureau of Land Management in the West has developed a new fire-fighting tool based on personal computers. The bureau is using Hewlett-Packards with graphic display capabilities to pinpoint potential sites for fires and prevent the widespread destruction they can cause.

Many forest fires can be traced to weather conditions or natural phenomena, especially lightning strikes. Using the Hewlett-Packards and a lightning detection system, the bureau is aware of lightning strikes almost as soon as they occur, even if they're several hundred miles away. This quick detection gives fire fighters a chance to reach the site while the fire is still manageable or, in some cases, before it has even started.



SOUTH CALIFORNIA

CENTER LATITUDE 36:07 CENTER LONGITUDE 118:55

GMT	LIGHTNING STRIKE STATISTICS	MDT
07/25	DATE OF FIRST STRIKE	07/25
20:48	TIME OF FIRST STRIKE	13:48
22:46	TIME OF LAST STRIKE	15:46
	NUMBER OF STRIKES: 324	

The ALDS produced this map of a known strike area showing the date and time of strikes, and their locations by plus symbols.

The Automatic Lightning Detection System (ALDS) is currently operating in wooded areas of the West. "Sensors are placed at 250-mile intervals throughout the western United States," says Richard Franklin, a California state fire and aviation management officer.

The sensors pick up the magnetic field of lightning strikes. "A lightning strike has positive and negative ions in it—it has energy," says Franklin. "The positive energy force of the lightning bolt constitutes the magnetic field."

When the sensor picks up a strike, it runs through a positional analyzer, which takes information from the direction-finder sensors. Then the system calculates and enters this information into the central processor and feeds it into graphics terminals.

At that point, the system produces a map of the strike area and an information sheet. Both documents include statistics showing the date and time of the first strike, the time of the last strike, and the total number of strikes registered in the area. Another printout gives longitudinal and latitudinal readings of the strike's location. "Within seconds we have real-time information," says Franklin.

When this information has been recorded, a hard-copy map is produced and sent by telecopier to the designated area. Then it's only a couple of minutes before the fire-fighting crew gets to the scene of the potential fire.

The time lapse between lightning strike and computer reading is less than six minutes. As Franklin says, "When you've got such a vast area to scan, time is of the essence. You can't use regular lookout aircraft for this—the space is just too large. Planes fly all around, looking for strikes and fires without knowing exactly where the strikes are occurring."

The system presently monitors approximately 95 percent of 11 western states and Alaska. "It can be used wherever there's a need," says Franklin, "and there are frequent lightning strikes. It's used in the West because the area has a known wildland fire problem."

In many of the timberlands of the western states, forest personnel are stationed in lookout towers where they watch for fires. "Actually, since it [the system] only detects strikes, and not actual fires, it serves to strengthen the position of the lookout person," Franklin says. "He can concentrate his efforts on known fire-watch areas. By consulting our records we can tell where fires caused by lightning have occurred and are likely to occur."

Reach out and byte someone!

Universal Data Systems

Your desk-top computer system is only a beginning — plug a low-cost UDS modem into the RS-232 port and a whole new world of communications opens up!

UDS modems add a new dimension to personal computers. For professional use, a modem permits two-way, hard-copy communication between home office and branches or among the branches themselves. Electronic mail becomes a reality. Sales, cost and inventory updates can be sent over ordinary telephone lines at economical, after-hours rates.

When you use your computer for personal applications, the modem allows you to access up-to-date market information, receive news and weather summaries, check airline schedules or even electronically scan out-of-town newspapers. Long-distance game playing and computer-age personal correspondence become instant realities.

The wide range of UDS modems includes one that fits your requirement perfectly. Top of the line is the microprocessor-based 212 A/D which communicates at 0–300 or 1200 bps, stores and automatically dials up to five 30-digit numbers and includes a complete prompting menu and full automatic test capabilities. Yet, with all these features, it costs only $745.

At the other extreme is the $145 103 LP, offering simultaneous two-way communications at 0–300 bps without an AC power cord. This unit siphons operating energy directly from the telephone line!

In between is a large variety of units — many of them in the LP no-power-supply design and all fully FCC certified for direct connection to the telephone system.

Don't be a computer hermit — treat your system to a UDS modem; then you can reach out and byte someone! For details, contact your favorite computer dealer or Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 205/837-8100.

UDS Universal Data Systems

MOTOROLA INC.
Information Systems Group

Another valuable feature of the system is its ability to track potentially dangerous weather systems. "Through ALDS, it's possible to actually track a storm," says Franklin. "We can send out, in advance, fire trucks and emergency power sources.

"In the last couple of seasons the system has really proven itself," Franklin says. "The average cost of putting out a fire which has spread over 10 acres or less is $2000. Fires covering more than 10 acres cost about $10,000 to extinguish. So early detection of a fire means a potential saving of at least $2000. And approximately 45 percent of all fires in California are caused by lightning.

"ALDS is a very simple system—programmed to the user's needs," says Franklin. "Computer specialists and electronic technicians from the Boise Interagency Fire Center come out to make adjustments to the system whenever they're needed.

"This system will eventually be tied up to the IAMS (Initial Attack Management System) weather system. Actually, it will take about two more years. Then we'll be able to determine the probability of fire—because we'll know the wind speed at the time of the strike, whether or not it was raining, and other important information."

ALDS has excited the interest of other groups besides the land management bureau. NASA has hooked into it to track potential weather threats to the shuttle project. The detection stations are contacted from the shuttle for weather, and especially lightning-strike information.

Computer Teaches Math Through Voice Synthesizer

There's nothing like a talking computer to get a kid interested in multiplication tables. At least that's what Dr. Gerald Myers of Scottsdale, Ariz. decided.

Because of a learning disability, Myers's 13-year-old son Kevin was having difficulty in school. "He was more capable of retaining auditory stimuli than visual stimuli," says Myers. This resulted in a low concentration level and a short attention span. Consequently, learning math proved especially difficult for the youngster.

To help his son with his lessons, Myers tried using a tape recorder that repeated various multiplication and division tables. Although this method proved helpful, Myers felt certain there was an even better solution.

He then developed a long math program, written in BASIC for his Heath H-89 computer. With an RS-232-C interface he added a Votrax voice synthesizer. For Kevin, the synthesizer was an important addition. The "voice" helps him retain information and holds his attention. "It's an interactive program," says Myers. "Instructions appear on the screen and it [the computer] also tells him what to do verbally."

The program, called Nivek (Kevin spelled backwards), took Myers four days to write. "I decided what I wanted to do and I just sat down and started writing," he says.

The program does multiplication, division, subtraction, and addition. It begins by verbally asking, "What is your name?" Following the typed response "Kevin," the computer replies, "Good afternoon Kevin. What would you like to practice?" If Kevin chooses division, he simply types "D," for multiplication he types "M," and so on. The computer then asks if he would like to practice tables or problems. If Kevin chooses a problem and decides he'd like to try another instead, he can change to a new problem, using the program's random number generator.

Although this initial setup was working well, Myers had one problem with the synthesizer—it's extremely phonetic. "The chip has to be able to decode what you're

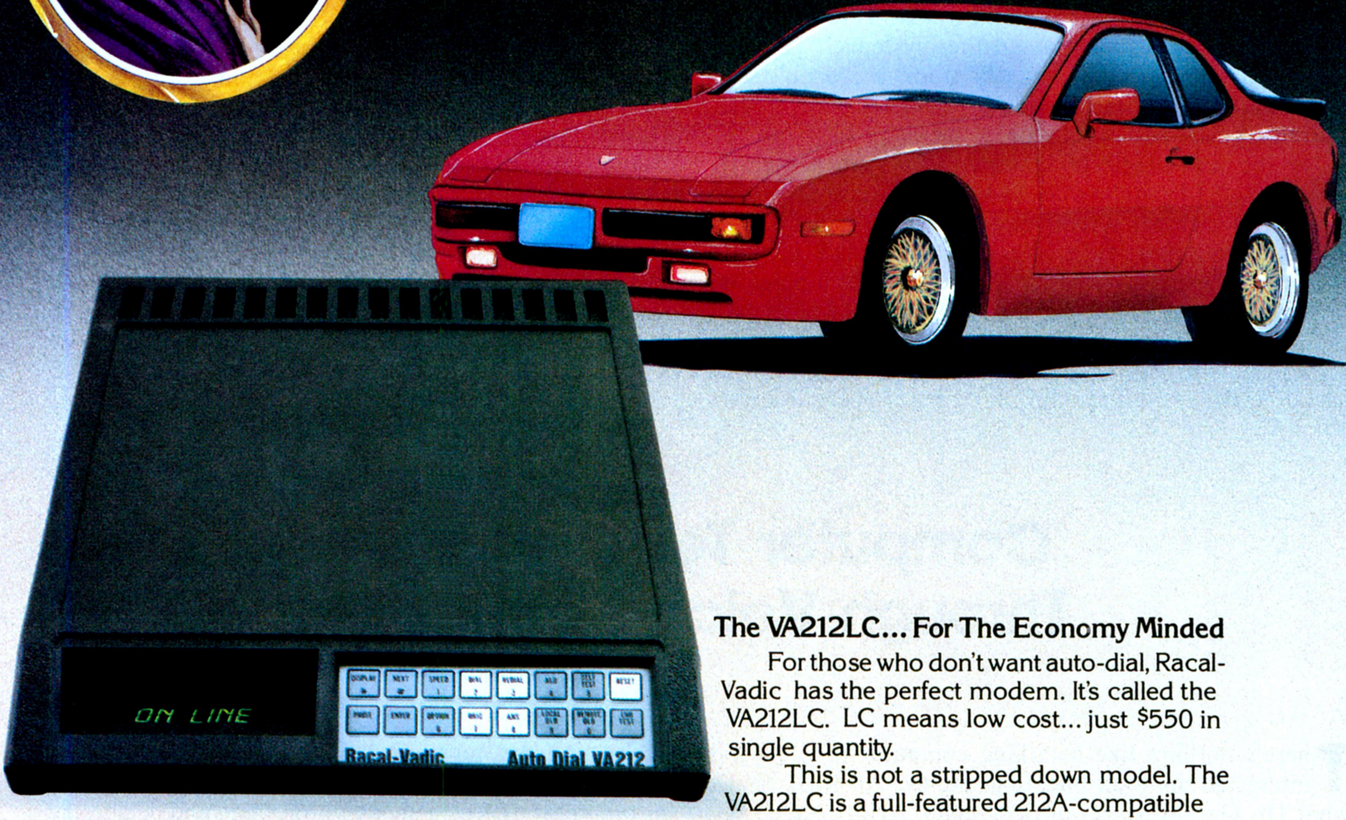
HAYDEN SOFTWARE AWARDS $7000 IN NATIONAL CONTEST

Five national finalists, aged 12 to 19, took home $7000 in cash and merchandise from Hayden Software Company's Kamikaze Shootout contest held February 21, 1983 in San Francisco. The winner was determined by the highest score obtained after playing three complete Kamikaze games or for six consecutive hours, whichever came first.

First prize of $5000 went to Christine Drda, 12, of Costa Mesa, Calif. The $1000 second prize went to 15-year-old Matthew Hill of Brookfield, Wisc. Thirteen-year-old Jason Meggs of Bethesda, Md. took home the third prize of $500. Allan Thompson, 14, from South Bend, Ind. won the fourth place prize of a $250 gift certificate. And 19-year-old Robert Stach of Wappingers Falls, N.Y. also won a $250 gift certificate for his fifth place finish.

Dear Ma:

Racal-Vadic has the Ultimate 212A. It's like getting a Porsche at Volkswagen prices!



The Auto-Dial VA212... For Those Who Want Everything

Racal-Vadic has the ultimate 212A-compatible modem. It operates at 1200 and 0 to 300 bps and has a built-in automatic dialer with a non-volatile memory that can store as many as 15 phone numbers, up to 31 digits each. Non-volatile means the memory is retained even if you lose power.

This remarkable modem "talks" to the terminal operator using English words and phrases to indicate call progress, option status, and telephone numbers in memory. Calls can be originated or answered from the terminal keyboard or the modem front panel.

The front panel is really something, Ma. It has a 16-key tactile-touch keyboard and an eight character liquid crystal display. Twenty-six user programmable options are stored in the modem's memory, and can be keyed in from the front panel... eliminating the need to open the modem to change options.

The VA212LC... For The Economy Minded

For those who don't want auto-dial, Racal-Vadic has the perfect modem. It's called the VA212LC. LC means low cost... just $550 in single quantity.

This is not a stripped down model. The VA212LC is a full-featured 212A-compatible modem with manual originate and automatic answer. It operates at 1200 and 0 to 300 bps full-duplex.

The VA212LC's extensive diagnostics include remote digital loopback and self test. Remote loopback allows end-to-end testing over the telephone from any of Racal-Vadic's regional diagnostic centers. The carrier indicator shows when you've established connection.

Now there is a real choice in the 212A market... A Porsche at a Volkswagen price... or the Volks itself at an even lower price.

Phone or write Racal-Vadic today!

Your Independent Thinking Son,

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saying," he explains. "When I wanted it to say, 'You are here,' I had to make this understandable to the computer by programming in 'U' rather than 'You.' I had to play with it and experiment with it."

Has the program helped Kevin? "Oh yes," says Myers. "His papers are coming back with 100 percent [correct answers] now. His grades have improved. There's got to be a correlation somewhere."

Kevin's older brother Michael also wanted to use the computer for his school work. Five years ago when Michael was in the seventh grade, he asked his dad for a TRS-80. Dad decided to strike up a bargain. "If he could teach himself BASIC, I would buy him a computer," says Myers.

Using the Honeywell computer system at school, Michael soon learned the new language. And his father kept his promise. With a TRS-80 to practice on, Michael quickly became an expert and began to lecture students at a nearby high school on computer applications.

Not wanting to leave Michael out of his programming endeavors, Myers developed a special word-processing program for his older son, just as he had developed a math program for Kevin. Part of the reason Myers developed the program is because Michael, now a 17-year-old junior at Brophy College Preparatory School and a member of the school swim team, didn't have a lot of time to devote to typing reports for school.

So, when Myers designed the word-processing program, written in Assembler and FORTRAN, he kept the entire swim team in mind. "I wanted to emulate a typewriter but still include the facilities for searching and correction," he says, "and make it as easy as possible.

"First I wrote down what the young men wanted as far as writing their papers was concerned," explains Myers. Keeping this information in mind, Myers wrote out some instructions for the text editor. By typing the word "help" there is an immediate choice for a short or long list of instructions. Myers feels that this makes the information more accessible to the students than if they had to constantly refer to a manual.

Consequently, the Myers household has become a popular teenage hangout. "They'll play pool while one of them writes his report," laughs Myers, "which comes out letter perfect." And that's not surprising. Not only did Myers create a word-processing program, but a spelling checker as well.

Computer Tabulates Marathon Results In Record Time

Brian Leffler was supposed to be at the finish line of last year's American Ski Marathon VI, a major cross-country event held in Vermont. Leffler was asked by race officials to tabulate the results of the race on his North Star Advantage personal computer. But with weather conditions being as volatile as they are in the north country, this just wasn't possible. Poor snow conditions forced a last-minute rerouting of the race course, which meant that the last leg of the race was skied at Bread Loaf, near Middlebury, and not at Brandon as scheduled.

In the wee hours of the morning before the 1982 marathon, race director Tony Clark called Leffler, telling him of the routing change. He asked him if he'd still be able to tabulate the race results on his computer, since he'd be away from the race site. Leffler jumped at the chance to use his Advantage in a new way—but first he had to write a program for this application.

With the race only hours away, Leffler went to work. One and one-half hours later the program was ready. He entered the data Clark had accumulated on the more than 700 registered entrants, including the name, address, bib number, and age class of each racer. Then, as the results came in at the Bread Loaf finish line, they were read to Leffler over the telephone. Within minutes after the last racer crossed the finish line, the results were tabulated—a saving of three to four hours over previous marathon finishes.

The next time Leffler participates in this event, he has promised himself that he will definitely be at the finish line, no matter what happens. The data and results of that American Ski Marathon will be collected and tabulated on Leffler's Epson HX 20 portable computer, which includes a built-in printer.

All of the registrants' data will be entered prior to the day of the marathon. And as each skier completes the race course, an electronic eye will catch the individual finish times as each racer breaks the beam. Almost instantly Leffler will have the results not only tabulated by the HX 20, but printed out by class. According to Leffler, "It's not a complicated program."

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It might not sound like a complicated program if you're a professional programmer, but Brian Leffler is a 16-year-old high school student who thinks "computers are the greatest invention since peanut butter."

His fascination with computing began four years ago when, after reading about personal computers in several magazines given to him by friends, he decided he wanted to own one. This meant saving money.

Leffler worked after school at his parents' general store in Leicester, Vt. until he had saved enough money to buy his own machine. Anticipating the purchase, he studied programming and other aspects of computing on his own. When he finally bought a Texas Instruments TI 99/4, he was ready to use it.

His interest and knowledge grew as he used his new system. He learned Pascal, BASIC, COBOL, C, FORTRAN, Assembler—by himself—reading volumes about computing, including books on advanced programming. "Currently, I'm working on a couple of commercial software products," he explains, "a multiuser operating system and a good accounting package."

For the past year Leffler has been involved in yet another computer project—Leffler's Computers—his own retail computing business in Brandon. His basement store/showroom was constructed with the help of his father, Frank. The store provides the potential buyer with a single source for hardware, software, and consulting. "The average sale," says Leffler, "runs about $7000."

Currently, Leffler's Computers handles about 21 brands of computer merchandise—too many for Leffler to manage in the basement of his parents' house. He's looking to expand his selling space, with the increasing business. "I think my business will continue to grow," he says. "With the price of computers at the current reasonable levels, I can't think of a small business that cannot afford to have one, taking into consideration the amount of time it saves."

One of Leffler's first business clients was the First Brandon National Bank. The bank was so satisfied with its computer system and with the service and "know-how" Leffler provided, that it has become one of Leffler's continuing sources of business advice and a recommendation source for potential customers.

And that's not all that makes this young man run—he's now writing a newsletter for a local computer group. "It's great fun," says Leffler. Writing a newsletter is one thing, but writing new users' manuals to go along with the computers and software packages that he sells is another. "Sometimes," he notes, "the documentation is so poor that I have to rewrite it for my customers."

But computers aren't the only things in Leffler's life. "I like to spend my free time away from computers. I get to use them so much anyway," he says. "I'm still a normal kid who's just very, very busy."

Keeping A Finger On The Pulse Of The Organization

Members of the National Association of Farm Broadcasters are a vital source of information for the farming community. Over the airwaves the broadcasters report farm news, market information, and weather—anything that might have an effect on the agricultural economy. Farmers see the radio reports as an essential link to their peers and to important data. In the same way, broadcasters feel that the NAFB offers them a chance to share information with their peers.

But the NAFB has 700 members scattered across the nation so keeping abreast of goings on inside the organization is a formidable task. And as executive secretary of the NAFB, George Logan is the person assigned to keep the NAFB running smoothly. He does this with the aid of an Apple II personal computer and PFS electronic filing system software.

Logan's job as executive secretary includes keeping membership rosters, address lists, dues received and owed, and general membership information. He invested in the Apple II in December of 1981 in order to keep his "fingers on all information about the members at a moment's notice."

Logan, who has been involved with the NAFB since 1957 and executive secretary since 1973 as well as the general manager of radio/television station WIBW in Topeka, Kansas, has lately had few problems keeping up with the additional work load. He credits the purchase of his computer for this. Using the Apple along with two disk drives, an Epson MX-100 dot-matrix printer, and the PFS software, Logan has computerized all the membership updates, dues collections, and address changes.

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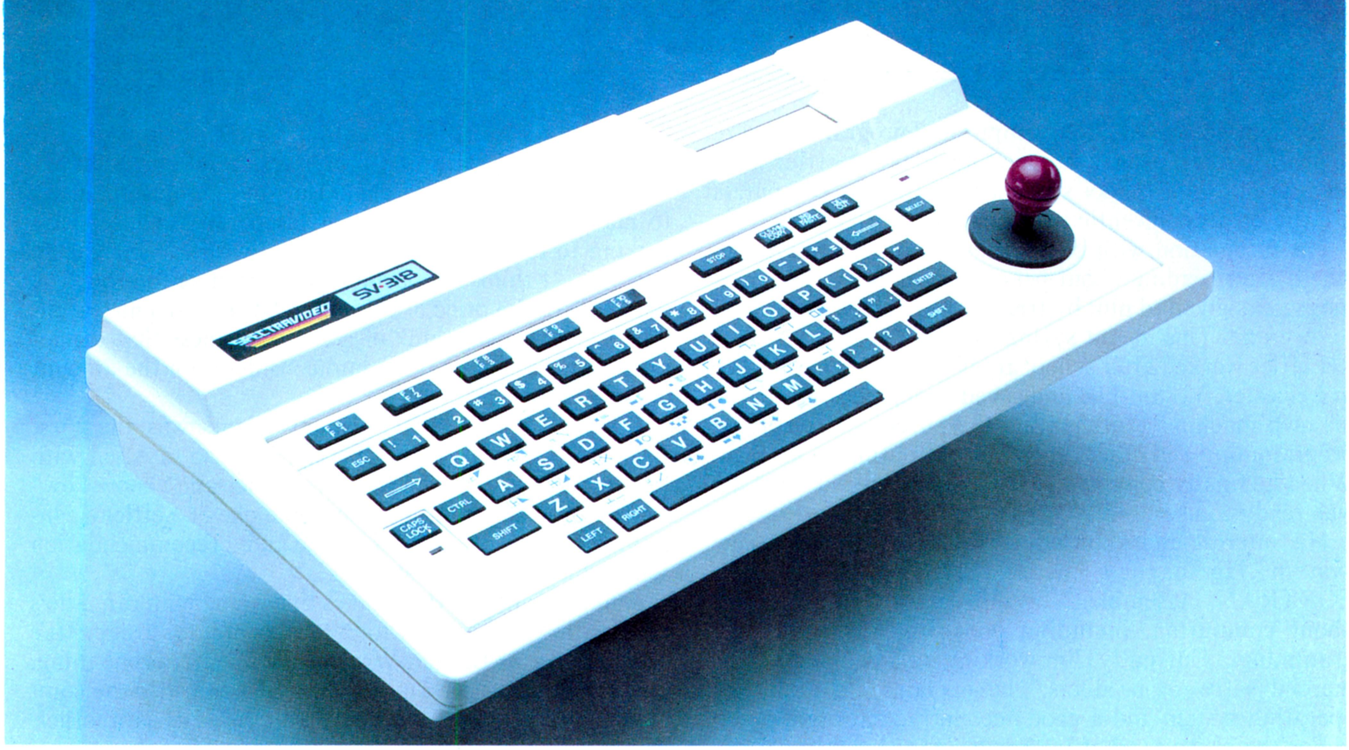

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USER DEFINE FUNCTIONS	10	N/A	4	8	10	NONE
SPECIAL WORD PROCESSING	YES	NO	NO	NO	NO	NO
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CIRCLE 21

best be described as no system at all," he says. "Files were scattered all over our regional offices. Trying to maintain accurate records was hopeless."

Further updating information on an organization of 700 members was no easy feat, adds Logan. Before he made the move to computerization, the data about each member was kept on a card file. "The work involved when any member moved or changed jobs was incredible," he says. "There was almost no way to do it except to sit down and retype the list."

The card files, the applications, the job-history files, the never ending flow of paper, has all been transferred to disk. And the new files list individuals alphabetically and regionally and include the date they joined or when they applied for membership.

According to Logan, one of the real joys of the Apple purchase is the speed in which he now produces reports on members. "Since January I've been sending out monthly reports to our regional and national officers showing the status of all members and pending members," he says. "We really didn't do that at all on a regular basis before." Previously it was up to each regional vice president to maintain records. "Now they've ceased this maintenance of their own records, and we keep everything stored on the disks and send them monthly updates.

Another one of Logan's tasks as executive secretary is mailing out newsletters and meeting reports to NAFB members. And the computer system has proven more than ample for this job as well. Logan finds it much easier to produce the mailing lists, and organize them, even fitting the needs of the post office in the process because PFS will sort the list by ZIP codes.

Besides keeping records of dues, addresses, membership dates, and job history, Logan plans to begin tracking attendance at meetings.

Overall, despite some early difficulties in learning how the computer worked, Logan is now a disciple of the system's virtues. "It has lessened the burden of paperwork and we now turn out dozens of reports that we just couldn't do manually."

Hand-Held Computers Aid Pilots With Flight Planning

When Orville and Wilbur Wright first sputtered into the skies on that historic day in 1903 at Kitty Hawk, North Carolina, they didn't have a personal computer on board to help them decide how much fuel they needed to fly their plane. And when Charles Lindbergh flew the Spirit of St. Louis across the Atlantic in 1927, he didn't have a personal computer to help him decide what his flight plan would be. But if a computer had been available to these aviation innovators, they probably would have thought it was a good tool to have in their cockpits—right beside their screwdrivers.

Soaring through the clouds with an Apple II or an IBM Personal Computer as your co-pilot, however, would indeed be a difficult task. But Tommy LittleJohn, a pilot and flight instructor who teaches the flying of Piper Cheyennes for Flight Safety International of Lakeland, Fla., was determined. He wanted a computer in his cockpit, and now he has one—a TRS-80 Pocket Computer that one of his students introduced him to about two years ago.

A week after seeing the pocket computer for the first time, LittleJohn went to the store and purchased one for himself. "I bought absolutely nothing but the instruction manual," he says. "I said to myself, 'I'm just gonna go after this sucker [by] trial and error!'"

And go after it he did. LittleJohn created a program for the TRS-80 pocket computer (now the TRS-80 PC 1) which provides a flight plan for pilots of Piper Cheyennes. These turboprop planes have jet engines with propellers and seat from four to 11 people. "They're basically owned by corporations who don't want to hassle with the commercial airlines and who can afford this luxury," says LittleJohn. "They're corporate aircraft used for moving executives from A to B."

The final program, which LittleJohn developed in a little more than a week, is "a very quick and practical way for the pilot to find out whether or not he can carry all the people the boss wants him to carry, and go as far as the boss wants him to go," says LittleJohn. "And all of this is possible with something that fits in your back pocket!"

LittleJohn's program provides the necessary information for a pilot to compile a flight plan. First, he enters the weights of both passengers and baggage. Following this input, the weight of the aircraft including its load will appear on the pocket computer's screen. If the pilot has exceeded weight limitations he'll hear a beep. If not, he

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can then punch in the number of pounds of fuel on board. Again the computer will respond if legal weight limitations are exceeded. If the load is overweight, "the pilot has the choice of either throwing a couple of guys off or reducing the fuel," says LittleJohn.

The program also helps the pilot with other aspects of flying the plane—gravity limitations, the longitude and latitude of his destination, the distance of his trip, wind velocity and direction, air speed, fuel flow per hour, the amount of fuel he has burned, and the airplane's final landing weight.

Although all of the pilots that LittleJohn teaches know how to fly a plane before they get to him, every plane is different. So using the computer gives them an advantage because the program knows the plane's limitations. And the program can be customized to whatever plane the pilot is flying.

LittleJohn says that people react with "a lot of amazement" the first time they see the program. A common reaction is for people to regard him as some type of genius, but he adamantly refuses the title. And he cannot understand what the big deal is all about. "I'm befuddled that anybody's interested in this program because I think anybody could do this," he says.

"A lot of people write and tell me that they want me to send the cassette (programs and data for the pocket computer are stored on audio cassette tapes) and I write back and tell them no, they can figure it out for themselves." And, says LittleJohn, "They call me back and say, 'You're right. I thought you were some smart guy but I figured it all out by myself.'"

Much of the program's simplicity, however, should be credited to LittleJohn. "I wanted to make it user friendly," he says. "You just press a button, answer the questions, and you find out the information you want."

"The thing that kills me," says LittleJohn, "is that they all thought they couldn't do it." But they do it everyday. It's the same knowledge they use constantly as pilots and "the same equations they write down every day on little pieces of paper."

Giving Business Growth A Computerized Push

Keeping a business healthy is much like keeping a body healthy—you have to work at it. When you work out, you carefully choose particular exercises to firm up certain parts of your body. When you want to strengthen your business, you similarly learn, and choose, which facts and figures will help you reach your goal. By using an IBM Personal Computer to keep track of such customer trends as the demographic information of current members, the staff of the Nautilus Fitness Centers in the Washington, D.C. area can now keep their business as healthy as their members.

"With the computer we're able to accomplish in a few minutes what used to take hours," says Jeff Neuburg, president of the Centers. "Most important, we can now keep records we couldn't keep before because they required too many man-hours to maintain."

The staff at Nautilus has used the computer and custom-designed data-base management software to compile information about members who have joined the centers over the past five years. Examining the information, Neuburg has learned members' average ages, incomes, and terms of membership.

From these data, an interesting statistic popped up. Neuburg learned that the number of women joining his centers had steadily increased. "We found that five years ago, women made up only about 20 percent of our total membership," he says. "And today, the number of women members is nearly equal to men." Neuburg can use this information to tailor some of his advertising to the female segment of the population.

The demographic data Neuburg has collected also helps him determine what forms of advertising would be most effective in reaching his specific audience. Knowing the average age of the people who are currently joining the centers allows him to place radio spots on appropriate stations. For example, if he wants to reach people in the 40- to 50-year-old age group, he can choose a station whose listeners fall into that demographic category. "Now, we can tailor our advertising and measure the results," he says.

Another use for the computer is to compile information from a recruitment card made available to potential members throughout the Washington area. Using information from the cards, Neuburg's staff can send out brochures and letters.

(continued on page 48)

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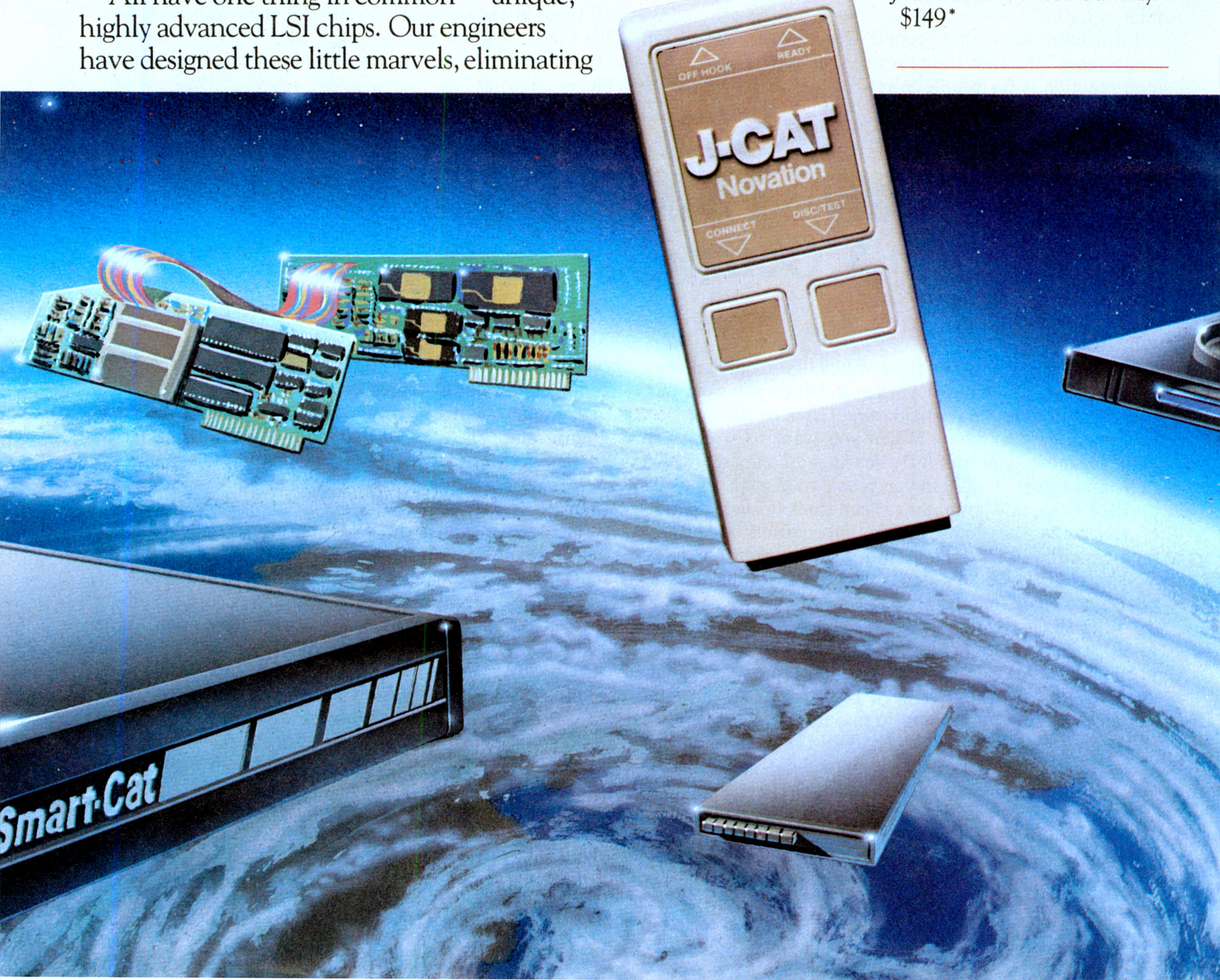

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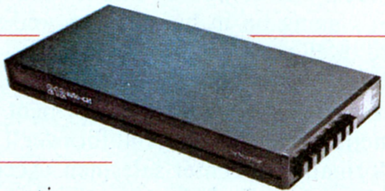

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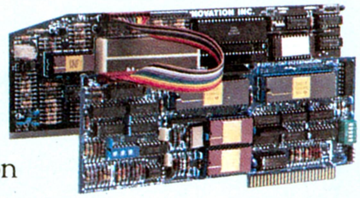

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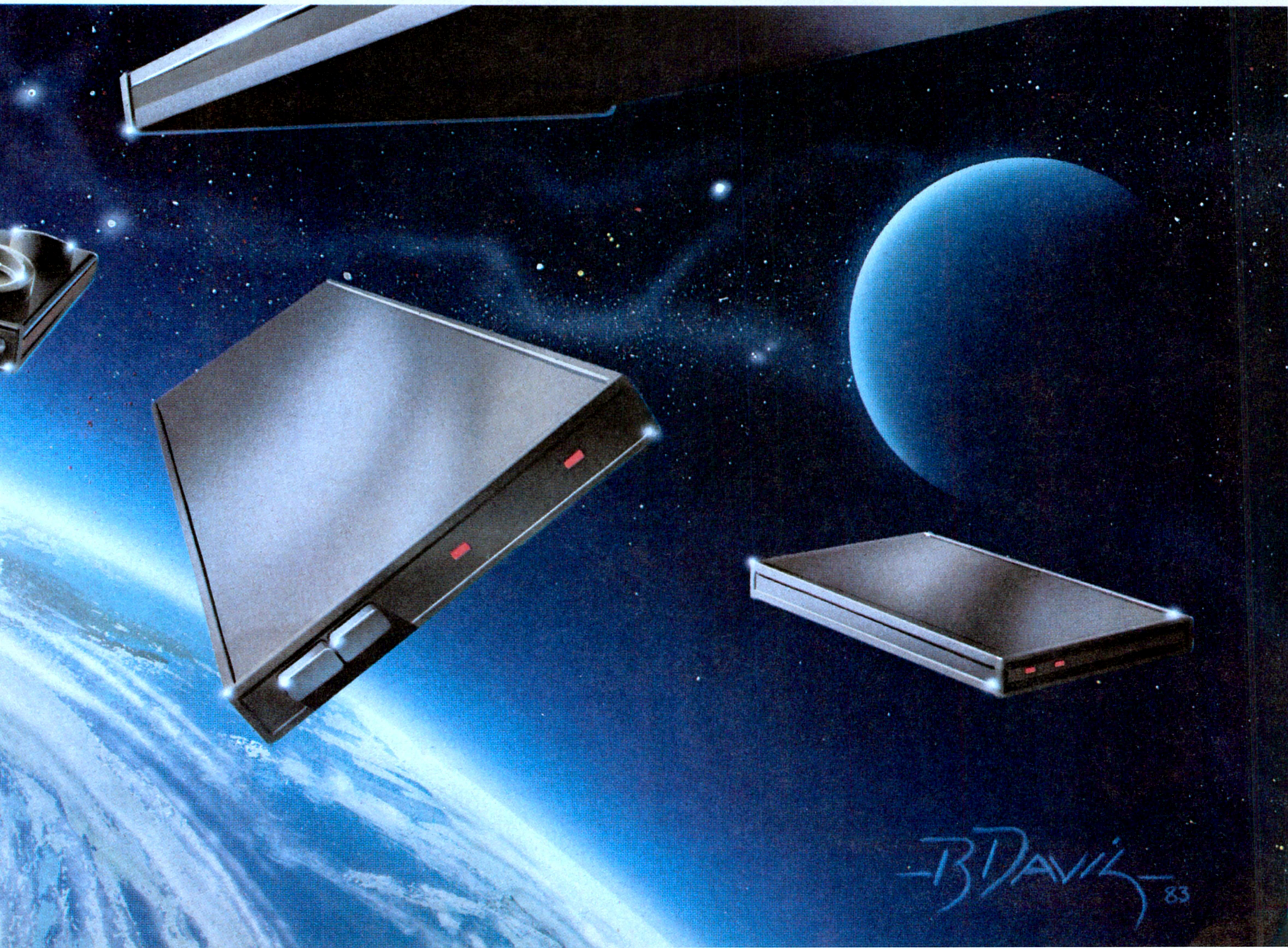

(continued from page 45)

"It's a real asset to my business, especially for mailing lists," Neuburg says. "We do a mailing every month—mass mailings are 10,000 pieces and individual center lists run about 2000 pieces."

The information Neuburg gets from the cards helps with future business planning. "We find out where our people come from (ZIP code and city)," he says. "This helps us decide where we should open up another club." He feels the computer allows him to monitor exactly what's going on in his business and consequently make more intelligent business decisions.

An IBM Personal Computer is helping a Nautilus Fitness Center shape up by keeping track of membership demographics.

Part of monitoring Neuburg's business involves bookkeeping—tracking the payment status of hundreds of members and the payroll for over 100 people—and the performance of center salesmen. According to Neuburg, making sure all of these functions were done and done right "was getting to be a nightmare." So he put the computer to work. "Without the computer we couldn't keep track of what was going on where. It's hard to do it by hand." But with the computer, Neuburg can track how many memberships each of his salesmen is selling at any given time. And monthly reports show what percentage of sales calls result in actual membership sales.

Plans for the future include adding programs that could directly benefit members. One would measure a person's strength, flexibility, body fat and oxygen intake, and determine a "fitness score".

Another program Neuburg plans to implement will measure a person's nutritional requirements and determine whether he is getting too many fats or too few vitamins. The member will keep track of all the food he eats over a 5-day period. That data will be input and analyzed to show the nutritional values of what the person is eating, what he should have, and how to get it. "It's basically nutrition, not exercise," says Neuburg. "We can give clients tests and input results as a means of comparison with the rest of the population."

Pharmacist Finds Computer Cure For Paperwork Blues

The growing cost of administering third-party payments to insurance companies and government agencies was strangling Alan Bierman's business. Bierman, owner of Valu-Med Pharmacy in Santee, Calif., found himself burdened by the regulations and paperwork of 150 different plans. He was beginning to be a full-time paper pusher and a part-time druggist. Bierman decided more help was needed if he was to meet the insurance company requirements so he installed a computer system developed by Pacific Pharmacy Computers of San Diego, one built around an Altos ACS8000 personal computer.

To illustrate the complications involved when third-party medical payments are handled manually, Bierman explains: "Say a customer walks in, insurance card in hand, with a prescription for Apresoline (a blood-pressure medication). First we look through the appropriate book to determine whether his insurer would, in fact, pay for the drug, and if so, then in what quantity. His doctor might have suggested 500 pills, but we may be authorized to fill only a three-a-day, 34-day supply.

"We then look to see if the drug appeared on an exceptions list permitting us to offer it only in its generic form, and peruse a price list, which we agreed to to honor before handling the plan." Bierman adds that that is a simple

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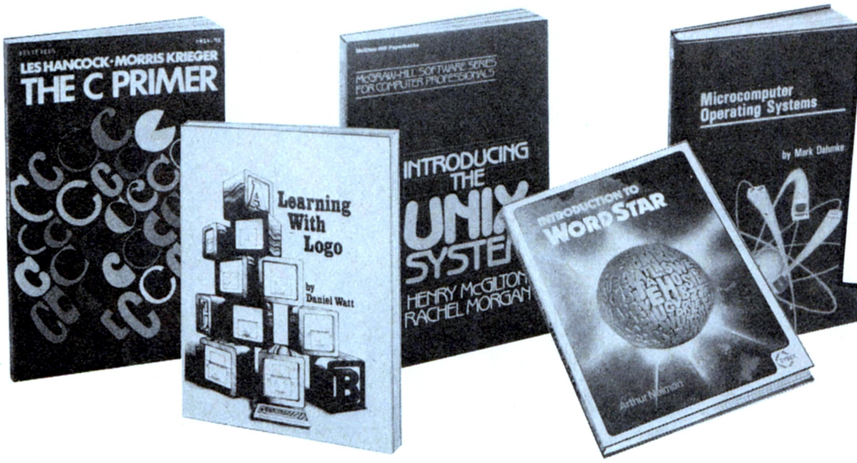
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example. At times abiding by an insurer's or the government's rules can mean grappling with hundreds of procedures.

"The state Medicaid program, for example, provides a list of drugs and prices that pharmacists can supply to those patients who are eligible," he says. "If you agree to honor the list, you must agree to their terms. And it's impossible to continually honor their terms without constantly monitoring their price lists.

"And after we've filled the prescription, we must type the appropriate form, submit it, and track the payment."

The computer has considerably simplified Valu-Med's operation, according to Bierman. To process an application now, pharmacy personnel simply type the drug's label on the computer terminal. The system confirms the names of the doctor and patient, provides the correct drug expiration date, performs all verifications, and stores the information for later billing. Because a universal claim form is acceptable to insurance companies the system can also type out billing forms directly.

Entering the applicable insurance and pharmaceutical information was easily accomplished using step-by-step prompting from the system. As Bierman notes, inputting was a one-time affair unlike the daily references to the manuals he once made.

"Information is only entered once because the forms are stored in memory," Bierman says. "These include Blue Cross, state programs, Workers' Compensation programs and other state and/or federal programs.

"The patient supplies us with all personal information but he wouldn't know the drug name, the doctor's code, the pricing, etc. In that way our system is a service to our customers."

In addition, the computer generates an end-of-day audit report giving him an overview of his business which assists Bierman in tracking day-to-day profits, checking inventory, and projecting the effects of changes in his pricing structure. And since the average pharmacy carries from 6000 to 7000 drugs, this can be a monumental task.

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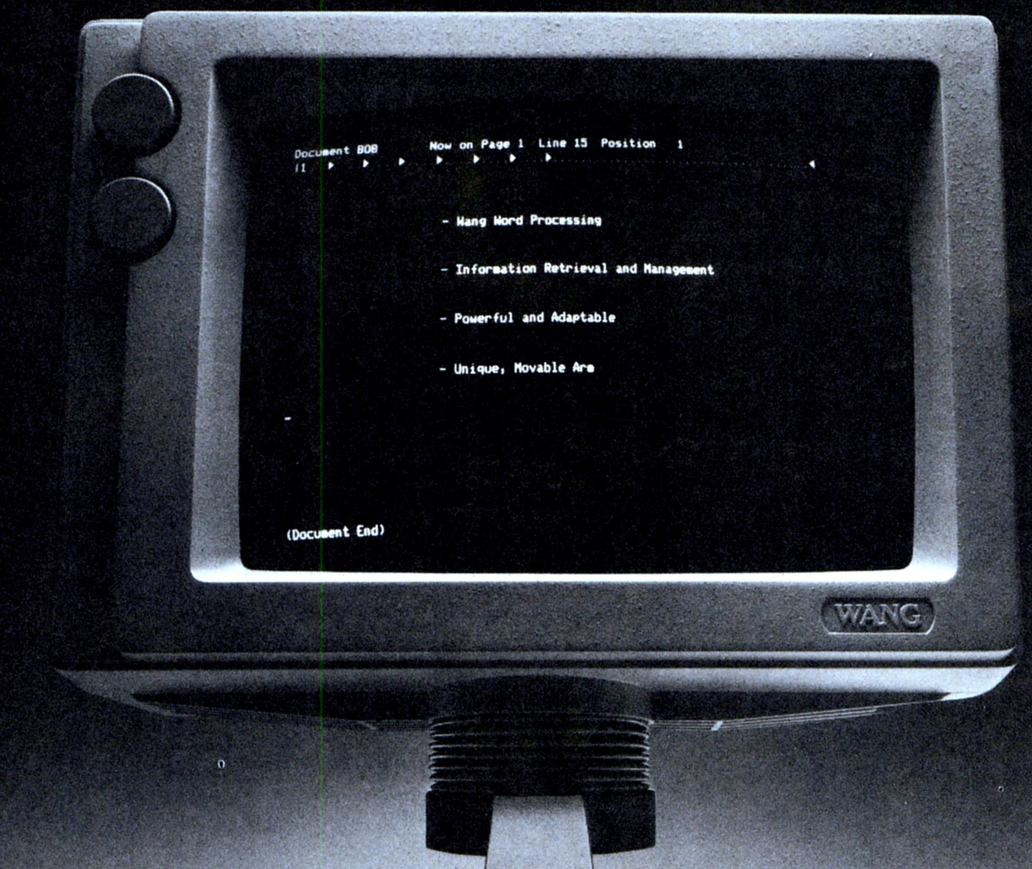

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*Benchmarks using CPU-intensive, interpretive BASIC programs.

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Since implementing the system in 1979, Bierman has augmented his three-person staff by only one, rather than the two or three additional workers he estimates would have been required without the computer. In addition, improved accuracy in tracking lost payments and providing the correct processing codes have added to the cost-effectiveness of the $22,000 system.

But probably the biggest advantage, according to Bierman, is that it organizes the pharmacy. All information is stored in one place—the computer. No file cabinets are needed to store insurance forms, patient files, etc.

Bierman says he is pleased with the service he has received from Pacific Pharmacy Computers. He says the company has updated the software and continually enhances it at no additional charge.

In offering criteria for other would-be pharmacist computer users, Bierman suggests seeking out a system that replicates the way a drug store actually functions. "The system should be simple and have a logical flow that makes sense to the user," Bierman says. "That way, the cutover time will be productive and the training period minimal."

Electronic Music Swings On The Air Waves

Bob Federer is one half of a songwriting team with a difference—his partner is an Atari 400 personal computer. The first product of this collaboration—a synthesized tune called "Prisoner of Love"—may never make the hit parade, but its unique sound is bound to create some interest.

"The beat generated by the Atari's built-in synthesizers was the beginning of the tune," says Federer, a 31-year-old engineer at the Round Sound Studios in Toronto, Ontario. "All the other parts of the song were built around it."

Federer developed the "Audio Processing Lab," a program which allows him to use a joystick to place different values into the computer's audio control. The program sets up a routine that digitizes base 10 numbers. "This allows me to create flaps—status indicators associated with special conditions—so when I POKE a decimal number into the audio control, the flags on the screen show me what sounds I've created," says Federer.

"You have basically a five-octave range, but this can be increased to eight octaves by jiggering with the audio control," says Federer. "You can get very precise tuning and extended range of the sound register."

Federer has been pleased with the "Audio Processing Lab," which he says took him only two days to develop. "It allows me to monkey around with the different sound channels," he says. "And there are so many different combinations that this is about the only way to experiment."

"Prisoner of Love," Federer admits, is still in its beginning stages. "I'm not sure if there will be any singing on the record," he says. "It will probably be mostly instrumental using a lot of synthesizer." The Atari is responsible for the background rhythms.

But the real issue in Tin Pan Alley is whether the song will be a hit. "Of course it will," laughs Federer. "It's got a contemporary sound and I think anybody listening to it would be fairly interested."

Musical programming by computer is "happening all the time," says Federer. At Round Sound Studios he also works on a Roland MC-4 microcomputer. "It'll store about 4000 notes and play about eight different parts at once. I can just keep layering and layering.

"People will come into the studio and give us an idea, or tell us the type of feeling they want to achieve," he says, "or they'll give me 50 different adjectives." Then it's up to Federer to find the right sound for the client.

One of his most recent endeavors involved a commercial for Canada's "Cash for Life" lottery. The drum containing the lottery tickets made no noise, so Federer was asked to synthesize the sound of the spinning drum. "I had to make it sound like something exciting was really going on."

"Prisoner of Love" is Federer's first collaboration with an Atari, but it probably won't be his last. He seems to have become a "Prisoner of Love" to his musical computer, and is already anticipating future possibilities. As he explains. "It's like a marriage between traditional sounds and the whole new range of sounds the computer can come up with."

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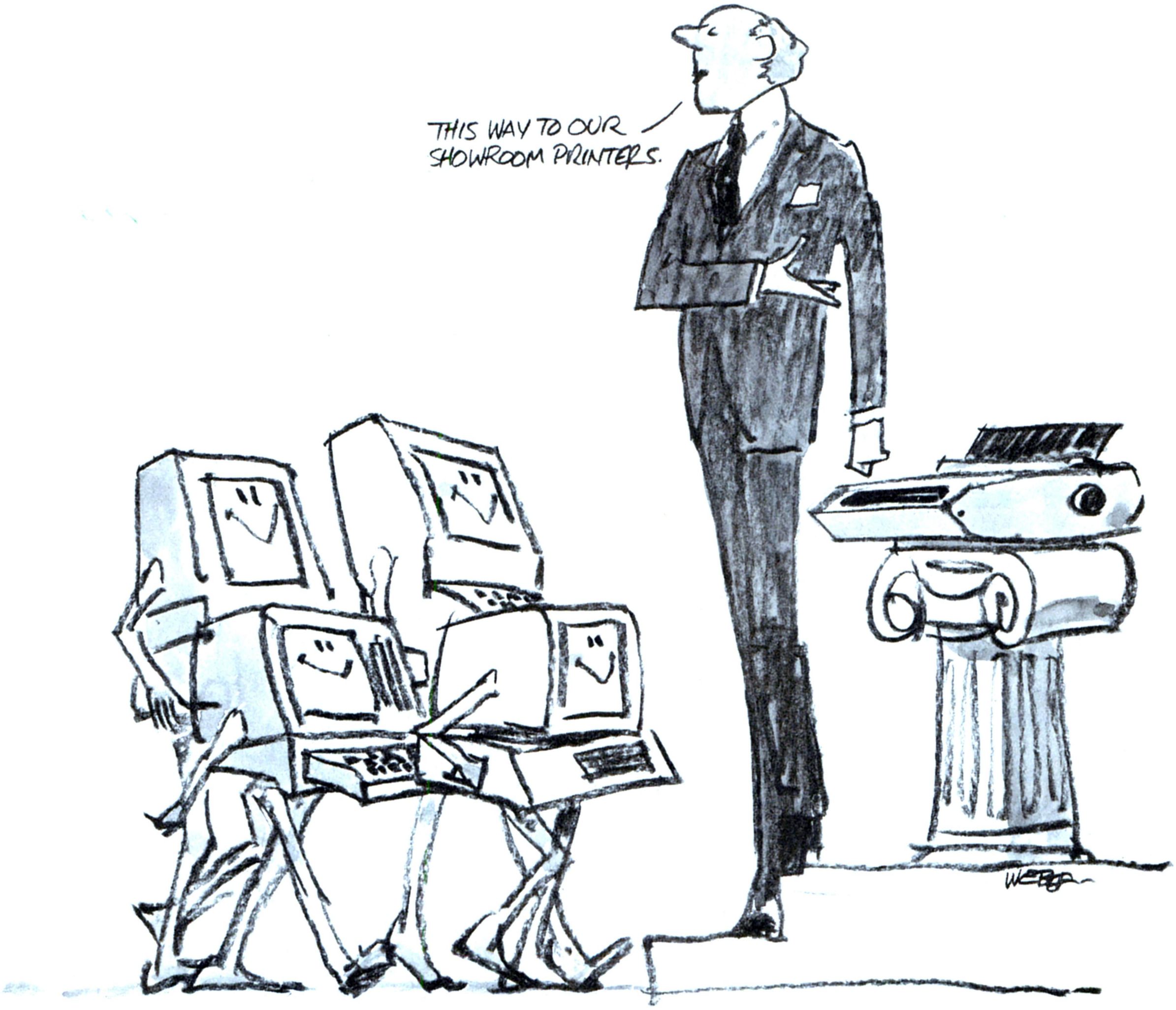
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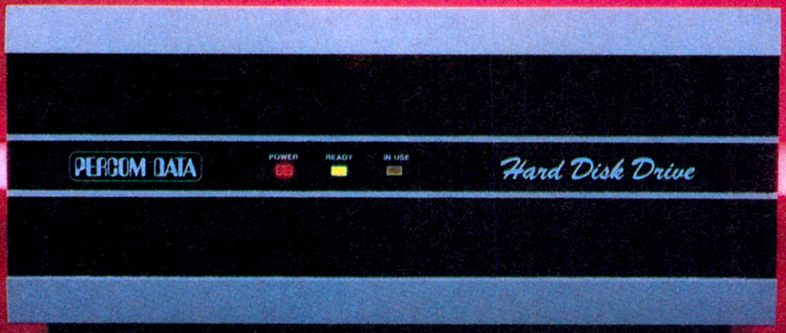

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CIRCLE 23

When Congress Asks To See The Bill

The Congressional Budget Office is using personal computers to make sure its forecasts are right on the money

by Jeffrey Rothfeder, Associate Editor

For personal-computer owners, high-level econometrics data bases were always a world away, available only on larger computers. But now, due to the efforts of a deputy director at the Congressional Budget Office and the growing numbers of personal computers on America's desk tops, the two largest econometrics modelers, Data Resources, Inc. of Lexington, Mass. and Chase Econometrics/Interactive Data Corp. of Waltham, Mass., have shifted their computer emphases. They have developed software that offers personal-computer owners access to some of the best budget planning and industry forecasting statistics in spreadsheet formats.

To the uninitiated, the term "econometrics" conjures up the thought of mysteriously jiggered numbers which, because they are so complicated, lead only to dead ends when used in business planning. But for people who use these models often, they are a godsend—a lifeline to timely economic information that makes the development of five-year (or five-week) plans an easier task.

Generally, econometrics models provide both industrial economic reports, and current statistics and forecasts on key national economic indicators. These include inflation patterns, stock and bond market highs and lows, interest rates, and wage scales. The models offer flexibility and accuracy for business planning. For instance, a manufacturer who supplies a product line to a particular industry can use the growth forecasts for that sector to decide how large an inventory he should develop over the next few years. Or, if a firm is preparing a budget and must project costs for the next quarter, it can draw on the patterns represented by hundreds of econometrics price indices to forecast future costs against historical costs. Perhaps most important, econometrics data bases break down U.S. economic factors—such as inflation, interest rates, and housing starts—into national and regional barometers, enabling firms to examine links between the broadest economic trends and their own situations.

In econometrics, information is the linchpin. But unless the data-base user can manipulate the data to produce answers to his questions, the information is useless. It's at that point that spreadsheeting makes its power felt. The recent advances in downloading econometrics data onto personal computers carry with them the added advantage of this information arriving in a spreadsheet or electronic worksheet format. The user can use this format to create individual scenarios for his particular business needs, and let the computer calculate the bottom line.

Bob Harris at the Congressional Budget Office was one of the first to see the importance of hooking econometrics data bases into personal computers and spreadsheets. Those data bases, Harris realized, would help meet the need for accurate budget forecasting—which is the CBO's reason for being. Since its inception in 1975, the agency has been charged with providing the Budget, Appropriations, and Finance committees on both sides of Capitol Hill with five-year cost estimates for each bill they are considering, as well as a yearly overview of the President's proposed federal budget.

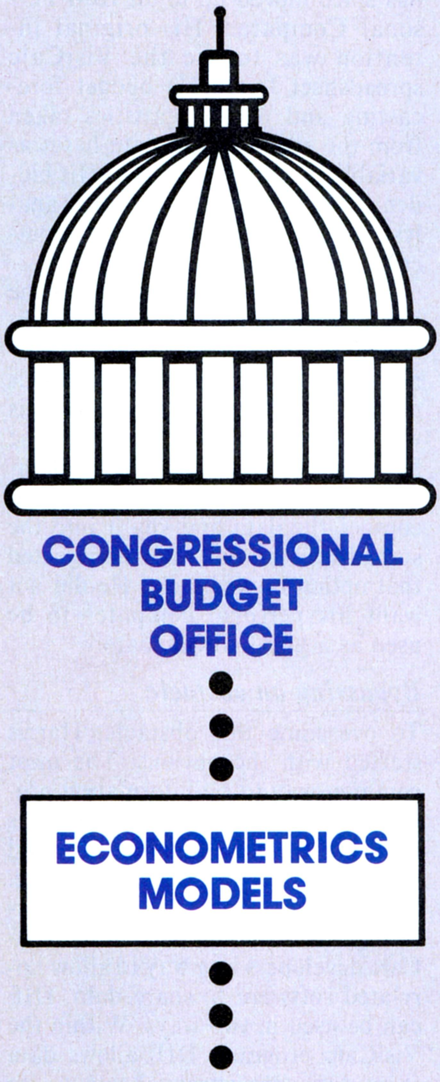
The CBO's record has been nearly flawless. For instance, when President Reagan, in fiscal 1981 which ended in October 1982, predicted a budget deficit of $60 to $80 billion, the Congressional Budget Office countered that its forecast showed the deficit would be closer to $160 billion. The CBO target was off by $20 billion—and despite the enormity of the number, a very close estimate compared with other, more popular estimates.

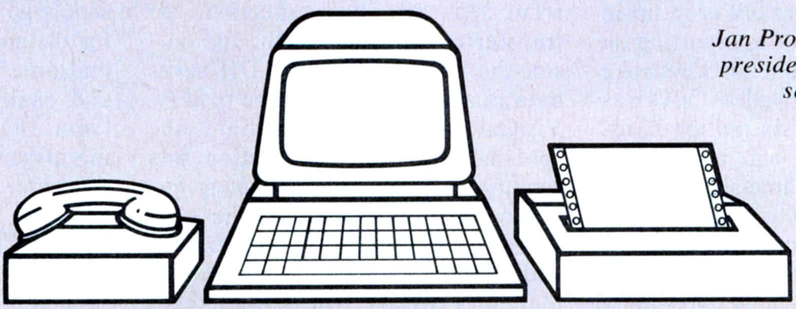
According to Harris, CBO's accuracy is due to the high quality of data the agency relies upon to perform its analyses. And having personal computers to spreadsheet the extremely sophisticated information CBO receives from both its own mainframe data base and the econometrics modelers, assures that the agency turns

“Having personal computers to spreadsheet our high quality data assures that we turn out on-the-mark projections.”

Bob Harris, a deputy director at the Congressional Budget Office in Washington.

Econometrics firms are just completing projects that will give personal computer users access to complex mainframe data without complicated programming.





Econometrics models, such as those provided by Data Resources, Inc. and Chase Econometrics, offer industrial economic reports, current statistics, and forecasts on key national economic indicators.

“We created the DataKits because we were sitting on a massive communications network that we had to make accessible to personal computer users.”

Jan Prokop, senior vice president for computer services, at Data Resources, Inc.

diagram by Robert Geibert Bryant Associates

out on-the-mark estimates and projections. Nevertheless, when Harris first joined CBO, things were not working nearly as smoothly as they are now.

For one thing, Harris could see that for the CBO to operate efficiently he had to bring "essential budget forecasting data home to a personal computer" and off the mainframe. "A good analyst must be with his data and have it in his hands," Harris says. "He can't always be in the process of reaching for it."

Actually, this was not a difficult conclusion for Harris to reach. When he came to the CBO in August 1975, computerization was restricted to time sharing, dumb terminals, and expensive data-processing departments.

At the time, CBO analysts worked out their cost/benefit estimates for each bill, or a five-year plan for the federal budget, by asking the data-processing department to get them hard copy of a specific statistic offered by one of the econometrics services. Then they figured out their forecasts using calculators.

Harris says this method of operation was completely inefficient. There was no audit trail to lean on if CBO statistics were questioned; and there were no archives to turn to if a bill was reintroduced with slightly different variables. Time was wasted in paper and data-processing logjams. Errors could easily crop up in the final results because inputting on a calculator left room for keystroke mistakes. The paper-laden CBO was being buried under six million hard-copy printouts each year just for annual budget work. Time-sharing connect costs continued to mount yearly; and perhaps most important, without spreadsheeting, various scenarios could not be played out easily—only one forecasting avenue was usually followed.

To put an end to the clumsy bureaucracy that was burgeoning at the CBO, Harris bought an Apple II computer in September, 1981. He has since moved up to an IBM Personal Computer. His original intention was to use the VisiCalc spreadsheet to do his budget forecasting and to use statistics taken from the econometrics data bases as variables in the spreadsheet. His hidden goal was to inspire the other analysts who worked for him to computerize in the same way.

But once he had the computer, he immediately ran up against the problem of getting statistics from the econometrics data bases directly into his personal computer. At that time, this was simply never done. One choice he had was to continue to ask the data-processing department for a hard copy of the data and key it into the spreadsheet himself. But he rejected that option immediately. He did not want his personal computer to be used as a glorified calculator.

Bypassing an obstacle

To overcome this obstacle, Harris started with the obvious. The most common way to tie information provided by a data base into VisiCalc is by using the DIF function provided as a part of the spreadsheet package. DIF, which stands for data interchange format, was created by VisiCalc developers as a way to allow unrelated software to share data. DIF can be used in two ways. Within the VisiCalc program, DIF allows data from separate spreadsheets to be transferred back and forth; and outside the VisiCalc program, DIF saves data in a format that can be read by VisiCalc and then integrated into the spreadsheet. The latter option was exactly what Harris was looking for. He needed to download the econometrics data from the mainframes and have it formatted so that when he loaded VisiCalc, the spreadsheet could read the data. Unfortunately, pulling information out of mainframes is not one of DIF's strengths.

"The DIF feature is nice when you are operating within the Visi family," Harris says. "It is a good transfer program for sending information between VisiPlot, VisiTrend, VisiCalc, and the like. And it doesn't require cumbersome commands for that purpose. But to move large quantities of information into VisiCalc from an outside data base, DIF is totally inefficient. Explaining to the computer what you want to do requires inputting almost two lines of program data for every line of information you want to grab from the data base."

What Harris is getting at is the fact that for each separate item of data to be downloaded, the DIF user has to tell the computer what spreadsheet "cell" (every box in a spreadsheet is termed a cell) that item is to go into. So, if Harris wanted to pull 50 economic factors from an econometrics model, he would first have to type in 50 separate lines of instructions to enable DIF to plug these factors into their correct VisiCalc cells.

Harris, who had worked as an information services chief earlier in his career, knew enough about computers to know that DIF was not an efficient route for him. Instead, he spent a few long days and nights and came up with a subroutine that bypassed many of DIF's failings. His subroutine simply tells the personal computer that it's going to get, say, 50 items of information from the mainframe, and that these items should go into VisiCalc cells A1-A50, for instance. That one line of information skirted DIF's 50-plus lines and enabled a successful download from the econometrics modeling mainframes into Harris's personal computer.

A baseline inflation rate

And Harris will soon complete the agenda of his ambitious efforts during the next few months in preparation for five-year CBO budget projections.

Harris will download onto the IBM Personal Computer all the price and

A good analyst must be with his data. He can't always be reaching for it.

inflation information DRI has gathered from 1970 to 1982. His intent is to come up with an accurate inflation gauge for the CBO budget. He can then turn the connect time off with the DRI mainframe, and save the data, which will be programmed to fit into specific VisiCalc cells. When he boots up VisiCalc, he will have a spreadsheet that lists overall inflation rate as the bottom line, and individual price factors—food, homes, utilities, foreign currency costs, and labor salaries—as the items influencing the bottom line.

Harris will examine the impact of the costs of food, home ownership, oil, exchange rates, and wages by eliminating them from the spreadsheet and then determining the impact of their absence on the overall rise in inflation. By isolating each factor from the total economic picture, and letting the computer figure out the leftover inflation rate, Harris will work out a formula that measures the "underlying inflation"—that part of the graph that excludes the shocks of drastic oil, food, and home price changes.

In a similar analysis, recently, the CBO concluded from DRI data that inflation between 1979 and 1982 has actually decelerated by approximately three percentage points, rather than the 13 percentage points that the Reagan Administration is taking credit for. As a result, these figures, compiled with a VisiCalc spreadsheet, have become the inflation barometer for all statistical and budgetary ruminations by the CBO.

In the same way, the CBO is currently doing an analysis of the infrastructure of the United States and estimating the future costs of keeping the nation's bridges, highways, and waterways in good repair. The CBO analyst working on this project downloaded onto his spreadsheet from an econometrics model, forecasts of the cost of materials and labor, inflation rates, and federal revenues. He then allowed the personal computer to cal-

BEYOND ECONOMETRICS

Econometrics modelers are not the only corporate personal-computer users who are able to download information from mainframe information banks onto their computers. A new venture from a well-established advertising and media research timesharing service is now offering clients with personal computers spreadsheet versions of over 100 separate statistical data bases. These include demographics and ratings reports based on the Neilson, Arbitron, and Media Mart surveys as well as a raft of proprietary industry studies.

Tel-Mar Group, Inc. was founded in 1968 and was the first firm to provide publishers, broadcasters, and advertisers with mainframe-computer access to the type of information that is essential either when they are considering which media to advertise in, or—in the case of broadcasters and publishers—when they are looking for advertisers to entice into their pages or onto their airwaves. The 15 years of Tel-Mar's existence have been successful ones; today, the firm has over 700 clients.

But despite its success, Tel-Mar has not stood pat. Its computer emphasis has shifted with the years. Mainframe access remains a hallmark of the firm's operation, but reaching the personal-computer owner is now central to the company's approach to selling information.

"Our job is to solve a problem for our clients," says Stanley Federman, chairman and president of Tel-Mar, "and we recognize that VisiCalc and other personal-computer spreadsheets are part of the solution in many of our clients' offices. With this in mind, we have to allow those who pay for our information the opportunity to download the data in a spreadsheet format onto their personal computers."

Federman is a veteran of the advertising wars, and as such he has over the years grown keenly aware of how important well-ordered information is to a well-oiled media firm. He was originally in the marketing division at Young and Rubicam Corp. and eventually moved over to its data-processing department.

Any personal-computer owner who subscribes to the Tel-Mar data base can, by using his own communications software, access the Tel-Mar mainframe and receive the information in one of two ways. First, it can be called up in the DIF format, a configuration that enables the personal computer to input the data into the cells of any spreadsheet that recognizes DIF. These include VisiCalc, SuperCalc, 1-2-3, and MultiPlan. Or the information can be received as a simple ASCII file, which is a basic data language, to be formatted into any specialized program that the user chooses. If the DIF format is chosen, no user programming is required; the complexities of working with DIF are dealt with at Tel-Mar's end.

A marketing division manager, for instance, might want to run a cross-tabulation to graph the frequency of use of 100 different products, and have it broken down into 24 age and income brackets.

"He can get on-line with our service and call for the particular cross-tab that he is looking for," Federman says. "Then after it is downloaded into his spreadsheet, he can do any number of demographic comparisons to see where his new product fits and how it compares with the current marketing schemes used by competing products."

Tel-Mar is not selling the service on a piecemeal basis. Only Tel-Mar subscribers, who also have to subscribe to a data base that Tel-Mar handles on its mainframe, can access the information on their personal computers.

Tel-Mar's steps into personal computing are not at all tentative. The company plans to go a lot further than downloading mainframe data. Federman says his firm intends to introduce a full line of advertising software as well as a communications package for personal-computer users in the media community over the next few months.

Harris's approach to econometrics has trickled down to have an effect on planners across the nation.

culate the final bill for keeping the infrastructure in shape. The beauty of doing this type of calculation on the computer, says Harris, is that if certain materials' costs, for instance, leap or fall during the next year, all the analyst has to do is call the spreadsheet onto the computer screen, change the price of the affected material, and the computer will recalculate the bottom line.

A $160 billion deficit

Dealing with $700 billion budgets may be a bit over the heads of most corporate managers and small businessmen. Indeed, calmly accepting a $160 billion deficit would be about as viable as asking the bank for a loan when your firm has already filed for Chapter 11 status. But Bob Harris's approach to econometrics and business forecasting on the personal computer has, it turns out, trickled down to affect business planners across the nation. At least in part because of Harris's trailblazing, DRI has just completed a joint venture with VisiCorp that offers Apple users—and soon IBM users—the chance to do what Harris is doing, but without having to write a separate computer subroutine.

The joint venture produced two interwoven software packages, VisiLink and DataKits, which connect the personal-computer user to DRI and enable him to retrieve DRI information in the VisiCalc spreadsheet format. The computer owner pays a fee for the connect time it takes to download the data, and a fixed price for the information itself. The data come in three basic categories: business analysis, which includes details of most major industrial segments of the economy; investment analysis, which is a portfolio and individual stock reporter; and an economic analysis, which covers financial forecasts and national economic trends.

"We created the DataKits because we were sitting on an expensive communications network that, with the proliferation of the personal computer in corporate America, had to be accessible to its users as well," says Jan Prokop, senior vice president for data processing. "The tide had simply turned that way. Now, rather than DRI presenting the data in finished form, the data can be manipulated at the site of the personal computer."

One of the first DataKit/VisiLink users in the country was Deena Lind, a consultant at Tsai-Spector Research Associates, a New York City-based firm that specializes in aluminum industry analyses. Lind, who was a beta test user of the software on her Apple II, got the package last July to prepare linear reports on the state of the aluminum industry.

"We're a small company," Lind says, "and for our needs the $1100 a month subscription fee we were paying to our econometrics time-sharing service was way too high. We only needed access to data as our analysts required it, not constantly."

Enter the DataKit/VisiLink package. To use the software, the computer owner first boots up VisiLink which, through a modem, connects his computer to the DRI mainframe. After a password and the user's credit card number are entered, a DataKits catalog appears on the screen.

"My earliest uses involved asking for the Steel Report DataKit which is in the business category," Lind says. "Then I was asked which type of forecast I wanted: 'an optimistic one, a pessimistic one, or a most likely.'"

She chose, at first, "most likely," but, in time, used all three forecasts for her projections. Then she was prompted to enter whether she wanted quarterly or annual data and for what period of time.

After answering these questions, Lind received a steel industry spreadsheet for the preceding three years and the succeeding four. The spreadsheet included such industry-wide items as average salaries, price fluctuations, overhead costs, factory capacities, and manufacturing costs.

"I then manipulated the data on the spreadsheet by using the steel industry-wide percentages as relative percentages that can be considered accurate for the aluminum industry in particular," she says. "What I came out with were separate forecasts covering salaries, costs, and price predictions for aluminum."

Then, using the VisiCalc DIF format, Lind transferred the data to VisiTrend and VisiPlot software to prepare charts detailing each forecast.

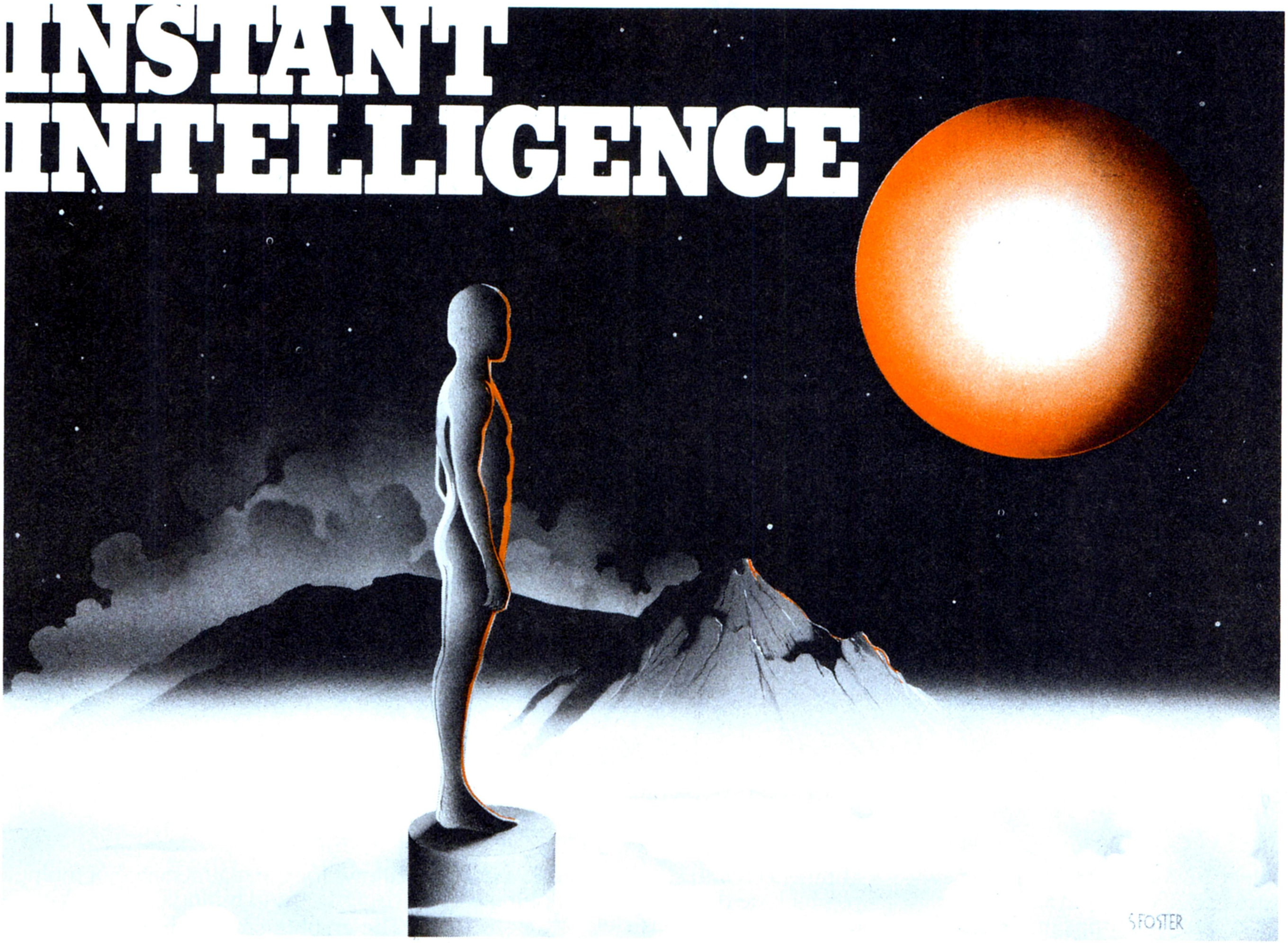
Following in the wake

The DataKits are making converts of an increasing number of personal-computer owners who were becoming overwhelmed by time-sharing costs and limitations—users who wanted more control over how the data were massaged. So DRI's closest competitor, Chase Econometrics, has quickly followed in its wake.

In a joint venture with Microsoft, the manufacturers of the MultiPlan spreadsheet, Chase has produced software called Financial Xchange, which brings its data to personal-computer users in either a VisiCalc template for the Apple, or a MultiPlan template for the IBM. The difference, between Chase's system and DRI's is that the Chase data and Financial Xchange are available only to subscribers to the data base. Thus, the Chase plan doesn't cut down on time-sharing costs, but does bring the power usually reserved for mainframes to the personal computer.

When Bob Harris made his first personal-computer connection to mainframe econometrics data, it made no difference to him that he was tapping an unexplored region of the marketplace. His success, though, has truly had an effect. It has made using econometrics statistics on the personal computer a reality for many businessmen who couldn't afford the cost of time sharing, or who didn't understand the virtues of the spreadsheet format.

INSTANT INTELLIGENCE



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CIRCLE 72

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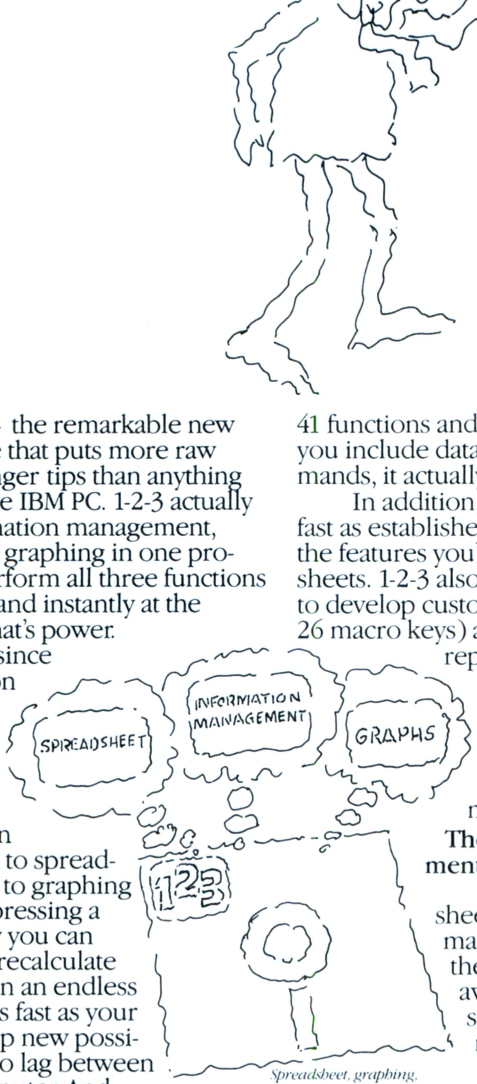

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The spreadsheet function.

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In addition, 1-2-3 is up to 50 times as fast as established spreadsheets. With all the features you've ever seen on spreadsheets. 1-2-3 also gives you the capability to develop customized applications (with 26 macro keys) and lets you perform repetitive tasks automatically with one keystroke. If 1-2-3 were just a spreadsheet, it would be a very powerful tool. But it's much, much more.

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CIRCLE 25

Computer Literacy: The Fourth "R"

"Blessed are the young, for they shall inherit the future." You can help your children prepare for their future with personal computing

by Trudy E. Bell, Associate Editor

A five-year-old boy and his eight-year-old sister sprawl on the living-room rug. He controls the drawing of an intricate geometric figure on the video screen of a Commodore PET, while she makes suggestions and notes his actions on a pad of paper. Undisturbed by their conversation, their 13-year-old brother is absorbed by the tables he's compiling on an Apple II Plus, for a report on chemical experiments he conducted over the weekend in the family garage.

Is this a family of precocious computer geniuses? Not at all—just three average children whose parents have given them the far-from-average opportunity to make personal computing as much a part of their lives as Little League, bicycles, and reading.

You only have to look at the situation in schools to see the signs of change. Today, two-thirds of high schools and one-third of elementary schools have at least one personal computer for their students—usually several more. A Personal Computer Educational Software Market Report recently published by Portia Isaacson and Egil Juliussen of Future Computing, Inc., states that by 1987 nearly all high schools will have personal computers, with an average of 35 computers per school. An exhaustive study recently completed by James Kulik and others at the University of Michigan has shown that children in secondary schools who have the chance to supplement their learning through personal computers learn more, do better in tests, and get better grades than children who don't have that opportunity.

As the growing use of computers in schools draws attention to the benefits of computer literacy, many parents are deciding to give their children a head start by installing personal computers in their homes. Parents are beginning to realize that if their children can get a big boost in their schooling just from having access to a personal computer for a few hours per week, they stand to gain an even greater advantage from being able to use a personal computer at home whenever they wish. According to Future Computing's report, these parents are losing no time: The fastest growing segment of the educational software market is educational packages for the home—a segment that's increasing at a rate of 71 percent a year. These parents know that children grow up quickly and that their education can't wait. They realize their children will be living in a future when not only will computer literacy cease to be a special advantage, but computer illiteracy will be perceived as a major disadvantage.

Today, many parents are considering buying personal computers for their children in much the same way parents in the 1950s considered buying their first television. But with those plans also come many questions of which the television age is uniquely aware: How can I choose the best personal computer for my family? How can we best integrate personal computing into our home life? How can I encourage my kids to explore all of the computer's capabilities and not just use it to play video games?

Computer literacy at home

Computer literacy has been called the "fourth R," a new addition to the familiar trio of reading, 'riting, and 'rithmetic. But computer literacy, like written language literacy, is an ambiguous phrase. Are you literate when you can make out a menu or a newspaper? Or are you literate only when you're comfortable with Shakespeare and Melville? In a similar way, computer literacy is a slippery matter of degree. Are you computer literate when you can use a simple word processor, or only when you can think in BASIC as if it were a second language? It's probably fair to define basic computer literacy as some familiarity with what computers do, and the ability to make them do what you want. Doing all that with pleasure, originality, and style might better be called computer fluency.

Basic computer literacy—like basic reading—can begin at home, even before you buy your first personal computer. Chances are your older kids have already seen personal computers and are curious, if not surprisingly knowledgeable. Chances are even greater that they'll be overjoyed when you announce that you plan to have one at home for them. Younger children may be a little hazier on the basics, but you can easily introduce them to the ABCs of what computers are and what they can do. A number of books and magazines are ready to help. (See sidebar on page 67.)

A small dilemma

Facing the actual task of buying a first personal computer for your family can be a bit of a dilemma—especially if you recall how time consuming it may have been to select one for your office. A good personal computer is at least as expensive as a dishwasher or stereo—and, as with any major investment of family funds, you want to be sure to get the best value for your money.

The selection of personal computers suitable for home use is broad, and you may find that choosing one depends on criteria rather different from the ones you used to pick a computer for the office. Comparison shopping over the whole range clearly will take time—time your schedule simply may not allow. You may be tempted to just write out a check for what seems the best all-purpose machine . . . but having seen the disappointment of office employees not consulted as to their needs or preferences, you won't really want to present the computer at home as a fait accompli. How can you choose the right personal computer efficiently, with the least amount of trial, error, and fruitless effort?

Try the old management technique of using one problem to solve another: Get your kids involved right from the start. Have them do a lot of the spadework. Since you're buying the personal computer to help prepare them for their future, this process is a golden opportunity to start their education even before you buy. Older children, when charged with an important adult responsibility, rise to the occasion: They can be indefatigable researchers, enthusiastic and serious. With proper direction, they may do a market survey of a completeness and quality that might astound you.

Examine various computer magazines with your children, reading ads and reviews of hardware and software—they'll quickly catch on. Discuss what features each of you thinks is important in the personal computer, and what you want to do with it—all the way from playing specific video games to learning WordStar.

This process of definition is also a good time to air questions lurking within each one of you about getting a personal computer. Are you afraid your children will spend too much time playing video games instead of doing homework or exploring programming? Are younger children apprehensive that an older brother or sister may dominate the computer and not allow them enough time to learn at their pace? Is one child afraid of losing a sibling as a playmate because he's absorbed with the new computer? These are the kinds of questions you can work out together in advance to integrate the personal computer into your home and make sure it's eagerly welcomed by all.

Selecting the home computer

As each child defines what he or she wants to do with the computer, write a list of these considerations. Encourage the kids to clip ads, write to manufacturers for more information, visit computer stores to look at various machines, and collect brochures. If your children are lucky enough to attend a school that has personal computers, talk to their teachers about their experiences with kids and computers. Weigh those observations against what you hear from the sales representatives at the local computer store. Remember, a sales rep's mission is to sell computers, whereas a teacher is likely to have the children's specific needs and well-being closest to heart.

Which to buy?

At this point your key consideration may be whether to buy an inexpensive computer for your kids to learn on—such as the TI 99/2 by Texas Instruments or the Timex/Sinclair ZX 2000, or to start right off with a full-fledged system such as an Atari 800 or Apple II Plus. There are tradeoffs implied in both cases.

If you opt for the less expensive computer, the chance of childish damage or breakage may become less worrisome to you. A membrane keyboard may seem like a good idea if your children tend to do everything with a peanut butter and jelly sandwich in one hand. However, your children may quickly master the smaller machine and outgrow its potential—without further chance to explore the true power of personal computing. If you consider upgrading at this point, you will once again be faced with the decision of which personal computer to buy. On the other hand, starting out with a more basic computer may help all of you to reach a more solid definition of what is important to you in the next purchase.

Depending on the ages and personalities of your children, you may want to start at the outset with a full personal computer. Discuss with them the fact that even though a computer can play games, it is not a toy. Set up basic rules for its proper care, respect, and use.

There are other hardware tradeoffs as well. Should you go for a relatively inexpensive cassette-tape memory storage? Or should you spend the extra money for floppy disk drives? The disks may be a challenge

Searching for a personal computer is a golden opportunity to start your children's education before you buy.

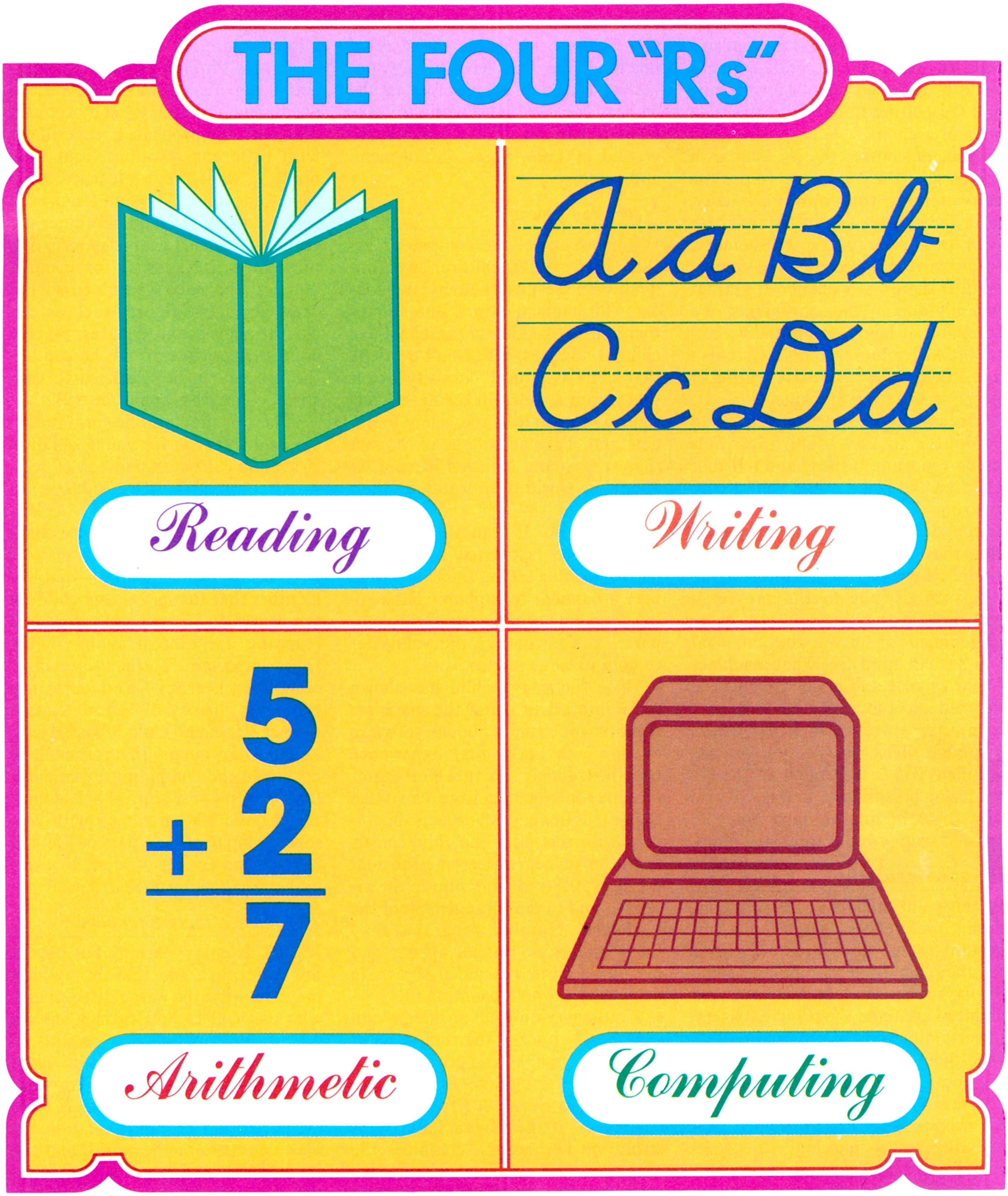
THE FOUR "Rs"
Aa Bb
Cc Dd
Reading
Writing
5
+ 2
7
Arithmetic
Computing

illustration by Robert Geibert Bryant Associates for small hands to insert and remove. Yet loading a program from tape can require 30 to 90 seconds—and a minute-and-a-half can be a very long and frustrating time in the attention span of a child.

And, of course, there's your own preference. Do you intend to use the computer for your own work—say, after the kids are asleep? In that case your own preferences for memory, software, and speed must be considered. If there's any chance at all that you might enjoy the convenience of a computer at home, you might be better off with a more capable system—and a firm set of rules about eating or drinking near the machine.

Once you've decided what type of computer to buy, determine how much you want to spend and tell your children the price range you're considering. Depending on the ages of the children, you may want to suggest that they each allocate a portion of their allowance or earnings from after-school jobs to the project—especially if they want to buy game attachments or software beyond what you have in mind. See what machines fit the criteria and price range you've decided on and take the kids to a computer store to look at what's available. This preselection process will help you sort through all the bewildering possibilities, and it will also give your children an opportunity to try and compare different machines.

What's important

At this point, step back: It's your children's preferences that become important. Some keyboards are easier for their hands to manipulate; some displays seem more attractive. If the children are to be the principal users, in certain matters of personal preference their votes should be the deciding ones. Encourage them to try different models, and to return later by themselves if they're undecided. After all, they're making a decision they'll have to live with for several years—just as you have to live with a car you select. Most important, when you finally bring home the selected machine, the kids have already invested a part of themselves in the choice—and will be starting to learn what it can do with a solid background of knowledge, commitment, and pride.

Never too young

Within weeks of the computer's arrival, your older children will undoubtedly be absorbed by the machine for hours at a time. But perhaps there's also a toddler or preschool-age child at home as well. Don't overlook that child's natural curiosity about this strange new flickering device, figuring the child is too young to understand. Take advantage of the fact that very young children learn a lot about the world from watching their parents and siblings, and imitating what they do. If your four-year-old stands there fascinated by the dot-matrix printer as you finish a report, take a moment to explain what's going on; point out the parts of the computer, and encourage the youngster to help in some modest way.

Once the young child has shown some interest in using the machine, there is much educational software available to make that experience both instructive and fun. For example, an alphabet package can flash animated images of objects beginning with the letter the child selects from the keyboard—serving the dual purpose of introducing him to the alphabet and to the arrangement of the keyboard. Number programs may make apples or oranges appear and disappear from the video screen in response to simple counting.

Kindergarten-age children can even begin to learn the rudiments of geometric thought and programming through the language Logo. Logo, developed by Seymour Papert and his colleagues at the Massachusetts Institute of Technology, combines the capabilities of artificial intelligence with the theories of renowned child psychologist Jean Piaget, in order to allow children to build intellectual structures through estimation, interaction, experience, and revision. Logo encourages children to set a problem, play with the problem to experiment with different solutions, and then build on what they've learned to do something more. Through Logo, even very young children quickly enter the realm of "turtle" geometry, creating procedures (programs) for using a "turtle" (the video screen's cursor) to draw geometric figures such as circles, triangles, and squares. As the child's experience grows, he can use the procedures he's learned to construct complex graphics at will.

A host of simple game-format educational software for young children is available from a number of software companies. (See sidebar on page 67.)

Some of these uses of the personal computer for a small child may at first seem inconsequential—but remember that for very young children the world is so new that fun and learning are almost synonymous. More important, a crucial aspect of computer literacy—and certainly computer fluency—is absolute confidence. If a small child is passed over as being too young—that is, somehow not up to the computing experience, that may plant a seed of self-doubt. But a child who grows up with personal computing as a part of life will have a good chance of remaining immune to computerphobia.

The most effective teacher

Most kids enjoy learning but have a low tolerance for tedium—which may be why the same fifth-grader who can collect and catalog insects with tireless patience is restless in class. Some of what children must learn in school is fascinating—but some of it is unremittingly dull. Rote memorization of multiplication tables, countries of the world, and the spelling of common words are among the worst offenders.

Even very young children can begin to learn the rudiments of geometric thought and programming.

Here's where personal computing really shines. Many teachers have discovered how effective personal computers can be in motivating learning through game-format educational software that reinforces knowledge in a way that's fun. A number of software packages make games out of flash cards, spelling bees, and historical facts. As with all software, some of these educational packages are more suitable, effective, and flexible than others. If you're in doubt about which ones might best supplement your child's learning, consult with the teacher—especially helpful if the school can make recommendations from experimenting with its own personal computers.

Devise a clever game

Alternatively, you can once again tap the old management technique of using one problem to solve another. If your third-grader is having difficulty memorizing the capitals of the 50 states and an older sibling is starting to learn programming, challenge the older child to devise a clever mix-and-match game of states and capitals to reduce the monotony of straight drill. Not only will the younger child be helped with his schoolwork, but the older one will be plunged into programming.

When, at around the fifth grade level, kids begin to write book reports and term papers, the personal computer used as a word processor can become an invaluable tool. For kids, the most time-consuming and frustrating part of turning in a paper is copying the first draft to make a neat, clean presentation copy. A simple word processor, such as Apple PIE or Bank Street Writer, is easy to learn and will give them a high quality finished product. Moreover, they will be learning a skill that will be useful to them in later life—perhaps even sooner than you think. You may find yourself the parent of a junior entrepreneur, earning spending money after school or over the summer by

A SAMPLING OF RESOURCES FOR PARENTS

BOOKS

Galanter, Eugene, *Kids and Computers: The Parents' Microcomputer Handbook*, N.Y.: The Putnam Publishing Group, Grosset and Dunlap, 1983.
A guide for parents who are considering buying a personal computer for the family.

Papert, Seymour, *Mindstorms*, N.Y.: Basic Books, 1980.
An account of child learning and of the effects of the computer language Logo in teaching children geometrical thought and programming.

Cohn, Theodore J. and Jacqueline H. Bray, *The Magic Machine*, Peterborough, N.H., Byte/McGraw-Hill.
A coloring book for very young children introducing them to the new family computer.

MAGAZINES

Most of the magazines currently available on children and personal computers concentrate on the classroom. Scheduled to begin publication in September, however, is a new monthly magazine *Family Computing*, on personal computing in the home. For more information write:
Avery Hunt
Family Computing
Scholastic, Inc.
730 Broadway
New York, N.Y. 10003

SOME OTHER MAGAZINES PARENTS MAY FIND INTERESTING OR HELPFUL ARE:

Classroom Computer News: The Magazine for Teachers and Parents
International Educations, Inc.
341 Mt. Auburn St.
Watertown, MA 02172
(617) 923-8595
$16 per year

Electronic Education
Electronic Communications, Inc.
Suite 220
1311 Executive Center Dr.
Tallahassee, FL 32301
(904) 878-4178
$18 per year; $3 single copy

Electronic Learning
Scholastic, Inc.
902 Sylvan Ave.
Englewood Cliffs, N.J. 07632
$19 per year; $3.50 single copy

SCHOOLS AND CAMPS

CompuServe Computer Schools
Daniel A. Meeks, National Director
5000 Arlington Centre Blvd.
Columbus, OH 43220
(614) 457-8600
There are branches of the Computer School in Columbus, OH, Chicago, IL, St. Louis, MO, Dallas, TX, Atlanta, GA with programs for both children and adults.

The Computer School
21 West 86th Street
New York, N.Y. 10024
(212) 580-1335
Offers courses in computer literacy and BASIC programming for both children and adults.

Atari Computer Camps
Dept. PC
40 E. 34th Street
New York, N.Y. 10016
(800) 847-4180
in N.Y. or Canada, call collect (212) 889-5200
Offers overnight summer camps at seven sites around the U.S. for children aged 10 to 16, using Atari 800 and 1200XL computers.

National Computer Camp
P.O. Box 585
Orange, CT 06477
(203) 795-9667
Offers overnight or commuter camps at four sites around the U.S. for children age nine to 18, using Apple and TRS-80 III computers.

SOFTWARE INFORMATION

Chartrand, Marilyn J. and Constance D. Williams, *Educational Software Directory: A Subject Guide to Microcomputer Software*, 1983, Libraries Unlimited, Inc., P.O. Box 263, Littleton, CO 80160, $22.50
A guide to educational software, distributors, and source materials both for home and school.

Classroom Computer News, *1983 Directory of Educational Computing Resources*, Classroom Computer News Subscription Dept., 341 Mt. Auburn St., Watertown, MA 02172, $14.95
An information source for educational computing listing projects, user groups, publishers, associations, hardware, software, computer courses.

Ten companies which are heavily involved with children's educational software are listed below. Write to each for a free catalog or other information describing their products and the personal computers on which the specific programs run. Apple, Atari and Commodore do not directly sell software from a central location, but distribute it exclusively through dealers.

Children's Computer Workshop
1 Lincoln Plaza
New York, N.Y. 10023
A subsidiary of Children's Television Workshop, producers of "Sesame Street." Distributes software for Apple computers, especially for preschoolers and younger children. For information as to your local outlet, call (800) 538-9696; in California call (800) 662-9238. By late summer CCW will offer software for TRS-80 Color Computer and Atari 2600 VCS game machine.

Edu-Ware Services
28035 Dorothy Dr.
Agoura Hills, CA 91301
(213) 706-0661
Publishes original software for Apple II, II+, //e, IBM Personal Computer, Atari 400 and 800 computers for ages four through adult, ranging from adventure fantasies to interactive tutorials and simulations.

Krell Software Corp.
1320 Stony Brook Rd.
Stony Brook, N.Y. 11790
(516) 751-5139
Publishes software for Apple+, //e, Franklin, Commodore 64, Atari 800, TRS-80 I, III computers mainly for older children, teenagers, and adults.

Learning Co.
4370 Alpine Rd.
Portola Valley, CA 94025
(415) 851-3160
Publishes software for Apple II, II+, //e, TRS-80 Color Computer, Atari 400 and 800 computers for children aged three to 13.

Minnesota Educational Computing Consortium
2520 Broadway Dr.
Lauderdale, MN 55113
(612) 638-0627
Distributes software for Apple II, //e, Atari 400 and 800 computers for preschoolers to adults.

Radio Shack
Educational Division
1400 One Tandy Center
Fort Worth, TX 76102
(817) 390-3302
Publishes educational software for TRS-80 Color Computer, Model I, Model III for children five to 18, the majority for classroom supplement.

Scholastic Software
P.O. Box 2002
904 Sylvan Ave.
Englewood Cliffs, N.J. 07632
Distributes educational software from many manufacturers for grades 1 through 12, for Apple I, II, II+, //e, Commodore PET, TRS-80 I Level 2, III, TI 99/4, Atari 400 and 800 computers. Also features a line of instructional games.

Spinnaker Software Corp.
215 First Street
Cambridge, MA 02142
(617) 868-4700
Publishes software for Atari 400, 800, Apple II+, Apple //e, IBM Personal Computer, Commodore 64.

Texas Instruments
c/o Consumer Relations
P.O. Box 10508, Mail Station 5828
Lubbock, TX 79408
(800) 858-4075
Publishes game-format educational software for the TI 99/4A.

Fritz Luecke, Mgr., Computer Software
Xerox Educational Publications
245 Long Hill Road
Middleton, CT 06457
(203) 347-7251
A division of the company that publishes *Weekly Reader*. Distributes software for Apple II+ and //e. Order info: (800) 852-5000.

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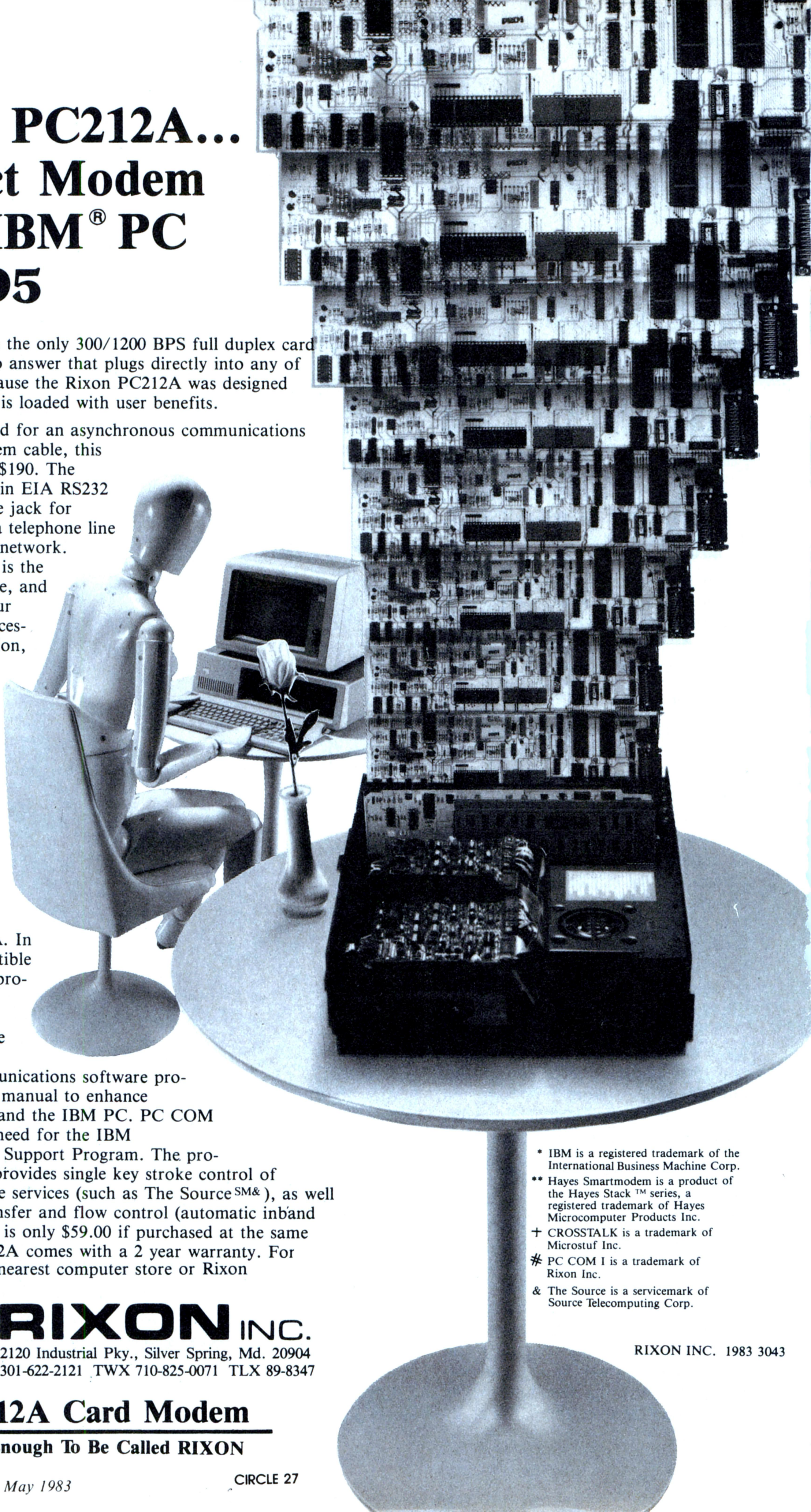

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⋇ PC COM I is a trademark of Rixon Inc.

& The Source is a servicemark of Source Telecomputing Corp.

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CIRCLE 27

Computer lessons can be as natural and simple an after-school activity as gymnastics, ballet, or music lessons.

doing word processing for hire instead of mowing lawns or babysitting.

Some word processors come with spelling checkers. Here you will have to face a personal decision only you and your child can resolve. Some parents may be afraid that dependence on a personal computer to check for spelling or grammar might encourage sloppy spelling habits—that the fourth "R" may undercut the other three. But convenience doesn't have to mean sloppiness. A spelling checker that presents the child with several alternatives for a word could have value. Many children are unaware when they misspell a word. The type of checker that compels the child to look up the alternative words in a dictionary and to select the proper spelling for the intended meaning could turn out to be more of a coach than a crutch.

Computer schools and clubs

As your children's knowledge and familiarity with their personal computer grow, their computing desire may change and deepen. Somewhere along the line—perhaps in junior high school—your child may begin to experiment with graphics or programming. Perhaps your daughter will become fascinated with the idea of formatting and composing camera-ready copy for the school newspaper, or your son will try some truly ambitious systematic catalog of his insect collection. Whatever the case, your child may hunger for more—with all the self-absorbed intensity that kids around age 12 can devote to a project.

When your child shows this kind of interest, one of the best things you can do is help find a personal-computer school or club. Continuing education courses in personal computing are springing up all around the country—in local high schools, colleges, and even private living rooms. The quality of these courses ranges from outstanding to very poor. Your best bet is to find out a bit about the instructor's background, and perhaps sit in on a class or two with your child to observe the level and method of teaching.

Some computer schools have courses designed specifically for children. One of them is The Computer School in New York City, established in 1981 by Dr. Eugene Galanter, a professor of psychology and psychophysics at Columbia University. Galanter, who based the curriculum on his experiences while introducing his three daughters to personal computing, is also the chairman of educational standards for CompuServe Corp. Galanter believes computer lessons should be as natural and simple an after-school activity as gymnastics, ballet, or music lessons. The Computer School begins teaching kids the rudiments of programming in BASIC as early as age seven, although in Galanter's view most children don't begin to display mature programming ability before about age 12. CompuServe itself has opened five computer schools in cities around the country.

Another source of learning is your friendly neighborhood user's group or computer club. Computer clubs are often set up around the brands of specific machines. Users' groups abound for owners of computers by Apple, Atari, Radio Shack, and many other popular models. Many such clubs have separate divisions for kids, where they can meet peers and swap ideas and programs. While not as formal as a course in a school, a computer club is a great way for your children to keep up with technical developments that may be important to their future, and to experiment in ways that may not have occurred to them.

A word to the wise parent

Don't overlook periodic workshops that may be offered for kids at local high schools, colleges, or universities. Your child may also find it stimulating to attend one of the many computer day camps held during the summer.

A thoughtful parent will recognize that several aspects of general parental wisdom extend to the introduction of a child to personal computing. Try to strike a comfortable balance between support and independence. In your own eagerness to give your child the best—and your own urgency about computing's importance—don't push too hard. Remember that even young kids have independent minds. Be sensitive to each child's specific needs, level, and personality—and how they evolve as the child grows. Respect your children's need to learn, experiment, and play on their own, and to satisfy their curiosity at their own speed.

Learning respect

Second, there are values that may be important to you that you will want to convey to your children along with encouragement, skill, and advice. Two basic ones are respect for the handling of the machine itself, and respect for the privacy of other people's disks and papers. Because of the ease in copying, altering, or wiping out a sibling's program in a fit of pique, discuss the need for conduct of honor.

It's clear that no matter how old your children are, there are many ways you can ensure that they get the best of personal computing. By exposing your children to new skills and knowledge, you can help them master a tool that will let them do what they want—and possibly more than they dreamed. They will be coming of age in a time when computing will rank in importance with reading, writing, and math. You can help them prepare for adulthood by offering them the opportunity to be not only computer literate, but computer fluent. Through mastery of personal computing, children can have one more strength preparing them to shape their destinies in the future they will inherit.

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CIRCLE 28

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CIRCLE 9

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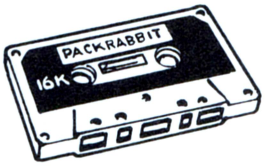

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The Well-Traveled Computer

To have a full-scale computer system as a traveling companion requires a strong dose of ingenuity. But the rewards are worth the effort

by Jeffrey Rothfeder, Associate Editor

Your business requires months of travel, and you need a computer. The question of how to carry it with you is important. It's a serious question that many computer users—salesmen, marketers, entrepreneurs—are facing as they travel the highways to sell their products or pitch to new clients. Carrying the computer, and with it the ability to keep strings of data in simple compartments and use information well can be a crucial variable in an equation that determines success or failure in a business venture. And, because the computer maintains the channels of communications and information between those who are traveling and those at a firm's home headquarters, it can be a significant road partner.

One way to take the computer along is to buy a portable machine, and, in a sense, carry a mini-version of a computer system on the road. But, to some, this is too limited. It is too large a sacrifice to give up the huge data vaults that can reside on hard-disk drives or to do without the letter-quality printers or the 80-column, 12-inch monitors offered only by full-size systems.

To continue to do full-scale computing while traveling is difficult. But at least one personal-computer owner has mastered the problem. He furthered his mobility while losing nothing in computing power.

Raymond Weiss, an agent who represents over 40 music acts that vary from the String Orchestra of Zurich to the New York Jazz Quartet, is on the road at least three months a year. His agency, Raymond Weiss Artist Management, Inc., is based in New York City, but he can be found more often than not in some remote location like Memphis, Duluth, or Bakersfield. His wanderlust is fueled by the necessity to either take care of his clients as they tour the country or to hobnob with chamber music societies, symphony hall owners, and teams of impresarios in a business where shoring up contacts and sponsors is a critical necessity.

Early on, Weiss understood the value that computerization could bring to him in terms of improving his skill and efficiency as an agent. He had met many other small businessmen who had bought computers and solved bookkeeping and data management problems that had plagued them for years. But because he was on the road so often, purchasing a computer seemed a wasteful expense. One option he considered was setting up a computer in his New York office and having his staff use the machine, following instructions he gave over the telephone.

This, however, made the computer a distant object for him—and an impersonal one at that. He felt that if he couldn't have a computer with him at all times, he wouldn't be getting his money's worth from the machine. The expenditure probably wouldn't be worth it, because the main reason Weiss wanted a computer was for personal use—to be able to do on-the-spot correspondence, keep track of tour accounting, and add information to his growing data base.

Weiss's choices were limited to either purchasing a portable computer without a letter-quality printer and hard-disk drive and modeming correspondence and bookkeeping data to the New York office, or setting up a completely portable personal-computer system. He went for the total system. But in making that choice, another decision was made by default. He would have to retrofit his 20-foot motor home which he often used as an office on the road to enable it to haul and store his computer system.

Mobile, but permanent

Though the computer would be mobile, it would have to have the advantages of permanence. Carrying 60 pounds of computer hardware into and out of hotels and motels was a back-breaking and unfeasible option. As it turned out Weiss's decision led to the production of one of the first full-scale computer systems that would log 40,000 miles a year. He is now able to remain in constant touch with the activities of his New York

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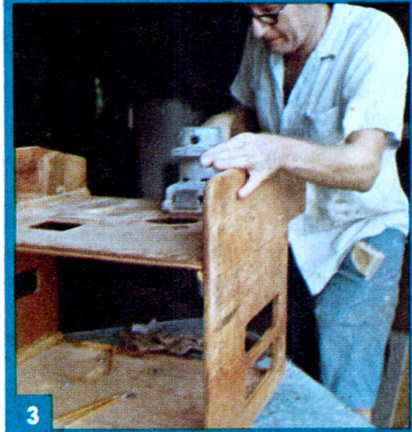
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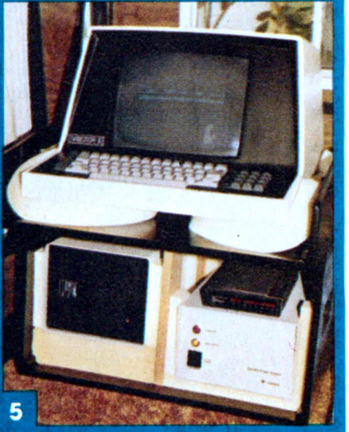
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6

7

HITTING THE ROAD . . .

1. Raymond Weiss's mobile home became a computerized office.
2. He replaced a chair, behind the passenger, with a workstation.
3. Weiss built the computer cabinet using plywood and epoxy joints.
4. The finished cabinet readied for computer installation.
5. The computer floating on foam rubber to withstand shocks.
6. Weiss keeps a daily tour audit on his road computer.
7. Weiss and three Kodaly quartet members go over the books.

photos by Raymond Weiss

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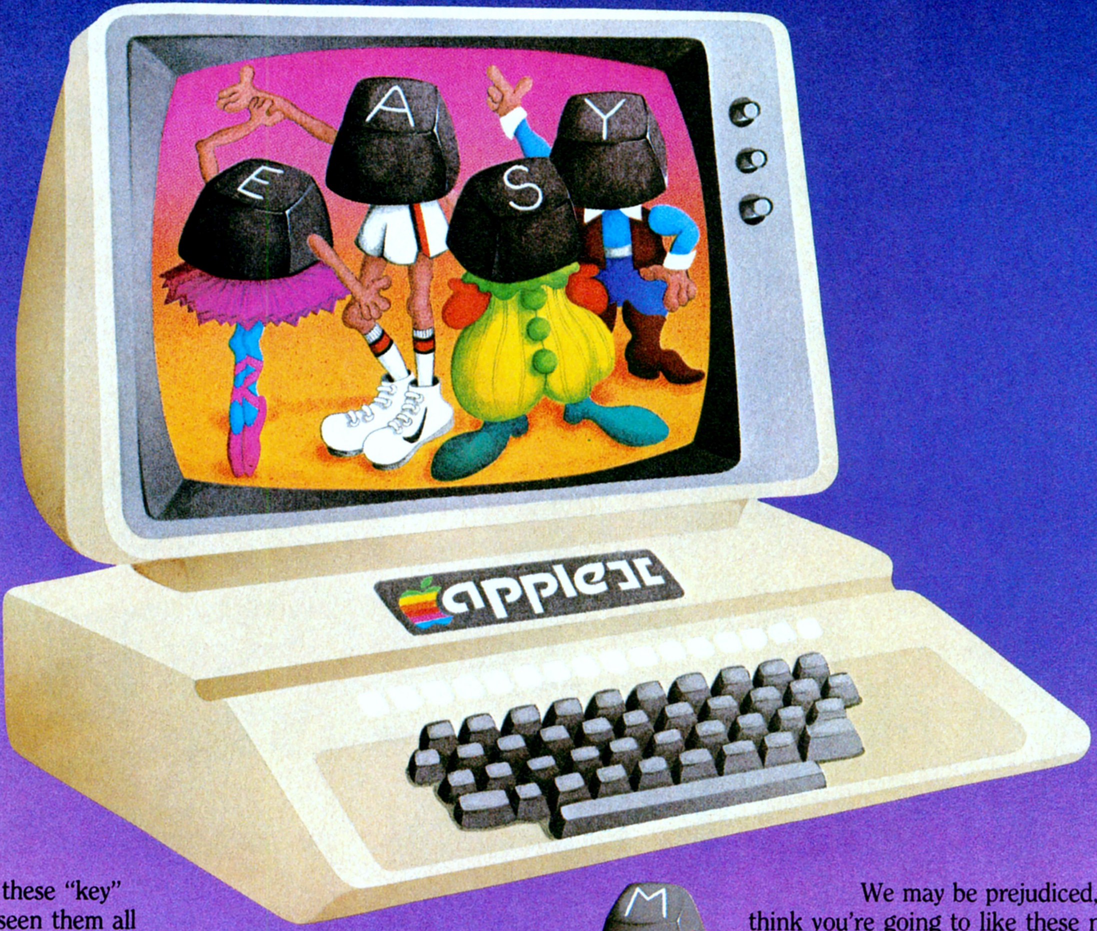

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The Enhancer II and Function Strip can be used with any Apple with a keyboard encoder board.

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CIRCLE 30

He made a foam rubber mounting device. The computer seemed to be floating on soft cushions.

staff while he travels. Information flows smoothly between the highway and the office, so Weiss always has facts or statistics at his fingertips. And perhaps, most important, he has complete use of a personal computer, which has made him a more efficient—and sought-after—agent.

In Weiss's case buying the computer was the easy part; it was setting up the machine that posed the most difficulties. Having, in early 1982, just produced a highly successful tour with the Zagreb Philharmonic of Yugoslavia, Weiss had come into the money necessary to purchase the hardware he needed. He asked Rosemary Gabler, a developer on the VisiLink software project for VisiCorp, and an acquaintance, to lead him through his hardware and software buy. Word processing—with a touch of data-base management—and accounting seemed to be his most pressing needs. So Gabler recommended buying the Memowrite word processor and the ExecuPlan spreadsheet for bookkeeping and running these packages on Vector Graphic computers.

The reason for Gabler's recommendations were simple—she was familiar with this hardware and software. Purchasing a computer is often, Weiss found out, an emotional buy. Weiss bought a Vector Graphic 5005—a multiuser system—for his New York office and a Vector Graphic 3005 for his mobile office. Both computers have 5Mb hard disk drives, floppy disk drives, and NEC Spinwriter printers. The entire system cost close to $25,000.

Special considerations

The equipment purchase went without a hitch. But now Weiss had to face the question of what special considerations are involved with hooking up a computer in a mobile home? "There are two main problems you come up against immediately," Weiss says. "One is 'What are you going to use for a power source?' especially if you want to avoid using a noisy generator, which I did. And the other problem is how to overcome the severe damage that travel vibration or tires bumping in and out of potholes can do to disk drives."

To keep the computer and its peripherals steady, Weiss leaned on some techniques he learned while rebuilding an old sailboat two years earlier using plywood and epoxy glue. He built a mounting device that secured the components with clamps and a tight fit, while at the same time rectangles of foam rubber ensured that whatever the conditions of the road, the computer hardware would seem to be floating on soft cushions.

The power supply was a far more difficult obstacle to overcome. Weiss contacted people in the electronics field who could shed some light on how to run a computer off a 12-volt automobile battery. He was directed to Tony Wiseman at the Portable Battery Division of SAFT America, Inc., who custom fashioned for him a power supply based on an inverter that switches the 12-volts up to 110-volts, enough to power the computer.

Weiss took the completed system, then, and secured it in the corner right behind the passenger's chair where a seat used to be. As Weiss puts it, that is truly when his personal roadshow began. Installing the computer in the mobile home took from May to October of last year, but it was time well spent. During that period he developed ways he would use the system while traveling, based on his experiences with the Vector Graphic in his New York office.

Perhaps the most important achievement having a Vector Graphic on the road has given him is the ability to travel with his clients as they tour. That allows him to keep careful watch on their bookkeeping records and cash balance as they make their way across the country. For many of his clients this is not a frivolous matter. "Especially if you're dealing with European clients," Weiss says, "the fact that both the computer and I are mobile is most important. First I have to make sure they pass through immigration safely, and then I have to monitor their expenditures and how much they earn while in the States carefully. Because a month later, when they're ready to leave the United States, the IRS demands an individual statement of earnings for each ensemble member. Without this they won't get sailing clearance. They won't be able to leave the country."

To keep his clients' ledgers Weiss uses a spreadsheet he drew up on ExecuPlan and which lists ensemble expenditures like groceries, hotels, traveling and entertainment, and ensemble income from artist bonuses, salaries, and percentage of house gate. "I can modify the information on this spreadsheet as it changes on a daily basis if I'm traveling with the group," Weiss adds. "Then when the tour is over, I let ExecuPlan calculate the bottom line—how much the group as a whole earned. And if it was a trio performing, for instance, I divide the entire spreadsheet into thirds and print out a separate income statement for each ensemble member. This way the group doesn't have any problems with American tax authorities when they leave."

In similar fashion, traveling with the computer allows Weiss to keep up with correspondence and remain in touch with people he needs to reach while he's on the road. Keeping abreast of the activities of national sponsors is closely tied to planning future bookings. And because he has his computer with him while he's traveling with one group, he can continue to organize upcoming tours. This type of work, otherwise, would have to be left to the home office staff, which in some cases, does not have the breadth of influence in the music community that Weiss has.

For this work, he uses Memowrite from Vector Graphic, which in some

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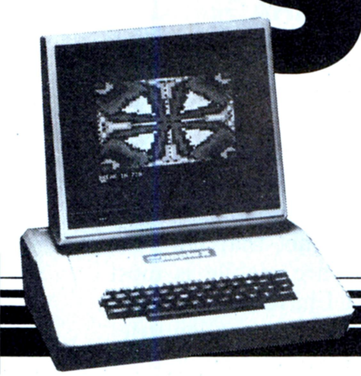

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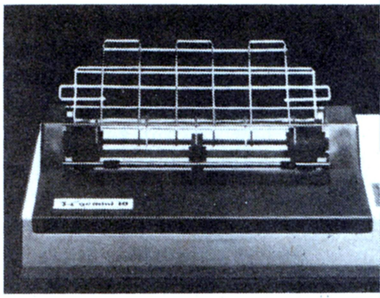

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CIRCLE 32

With alligator clips attached to pay phones, Weiss modems New York at 5 p.m. each evening.

important ways is part word processor and part data-base manager. It has room for up to 40 clarifiers—or search words—that allow him to call up groups of information using key words. For instance, if the Ensemble Instrumental de France is already booked to tour over the next two months, but a weekend cancellation in Hartford, Conn. forces Weiss to look for a vacant hall on the East Coast, he can pull from Memowrite the original form letter he sent describing the chamber orchestra and the dates of its planned tour. Then he keys in the command to run off a mailing list that contains all the sponsors in Ohio, Pennsylvania, New Jersey, and Massachusetts that hold weekend concerts in halls capable of seating 2000 or more people. With this in hand, he can send a mailing to these sponsors by the end of the day and not lose any time in rebooking his ensemble.

Ritualized communications

Weiss clearly prizes the convenience of the computer as a road companion. In all respects it's made his necessary travel time more productive. He is especially pleased with how the computer allows him to keep in touch with the work being done at his New York office. Communications between the traveling side of Raymond Weiss Artist Management and the home office are almost ritualized.

Every evening at 5 p.m., Weiss prepares a package to be sent to New York by computer that contains jottings made during the day. It is usually a report about four screens long that includes the status of anything he's been working on while traveling, a list of what he would like done in the home office during the next day, ideas for certain staff members to consider, and correspondence that needs additional information before it is mailed out. The complete report is sent via modem.

"So at 5 p.m. everyone knows what has happened on the road," Weiss says, "and they can respond with information about what has been happening at the New York office. We can transmit information about what needs to be done or thought about and spell it out concretely, without wasting money and time thinking over the long distance lines. The computer also affords us as close to perfect accuracy as we can expect to get. Critical parts of letters can be phrased exactly as they need to be or reviewed and revised to be sure they make exactly the point that needs to be made."

At least tactically and physically, making these daily data communications calls from the road is probably Weiss's most difficult accomplishment. He uses a Smartmodem from Hayes, running at 1200 baud—Weiss, who is ever vigilant about his business' pennies, says simply that "a 1200-baud transmission costs one-quarter the amount of a 300-baud transmission, because the connect period is one-fourth the time." But making the connection while traveling is sticky.

The communications software that Weiss uses most is Trans 4 and Rec 4 from Byron Software Telecommunications. After he boots up the software, he ties the Smartmodem into a pay phone—or a friend's phone—by using long wires tipped on the phone end with alligator clips. He gives the modem the telephone number to call, tells it to dial, but instructs it to wait one and one-half minutes before attempting to send the file. (He figures that it will take just a little less than that to give his credit card information to the operator.)

"After the modem finishes dialing the number and the operator comes on the line, I quickly have to tell the operator to not let this call go through," Weiss says. "I have to explain that it's a data transmission call and if she lets it go through while I'm giving my credit card number all she will hear is that high-pitched tone of the computer at the other end of the connection. And she'll probably hang up. Explaining this type of phone call to operators in some of the backwoods of this country requires the patience of a saint."

Still, most of the computer connections are made with little trouble. And one of the beauties of Trans 4 and Rec 4, Weiss says, is that after he sends his file to New York, he can receive a file in return without losing the telephone carrier line. This is not the case with most of the other data communications software packages. When the transmission between New York and the mobile office have been transmitted, in many ways, the firm's work day is over. But the staff and Weiss are one step ahead. Their computer-carried missives have already laid out the next day's work.

Breaking through barriers

Raymond Weiss feels the sense of accomplishment that comes from breaking through barriers. He is one of the few computer users in the country who is able to travel with his entire computer system and not give up letter quality correspondence and 5Mb memory just because his work forces him to spend months on the road. His latest brochure proclaims that "because of the acquisition of a highly sophisticated Vector Graphic computer system, we are now in a much better position to serve both our artists and our clients more effectively."

To live up to that statement, Weiss is setting up a system where concert sponsors can receive information via personal computer about any of his artists and program updates about their tours. His expectations have been aroused. Weiss feels that he is leading concert management out of a staid past into a high-tech present.

"Trying to run an artist management company today without a computer," he says, "is like trying to plow a 40-acre field with a one-horse plow."

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CIRCLE 34

Stretching Your Software

There may be more potential in your software than the package proclaims

by David Gabel, Senior Editor

One of the great things about personal computing is its versatility. We're all familiar with the wide range of functions they can perform—from word processing to spreadsheets to filing to telecommunications. Conventional wisdom says all you need to do is buy a program for a particular application and the program will do all the rest.

The really interesting thing, though, is that you might not need a new program in order to use your personal computer for a new application. Sometimes, if you put your mind to it, you can do things with your personal computer and software you might never have thought possible. How about using your word processor as a communications program? Or using a spreadsheet as a word processor, or a data-base manager as a general accounting package? Or a spreadsheet package to do accounts?

It's all possible, because the capability for modification is inherent in general-purpose packages. You may even find using a package for a purpose other than the one it was intended for is easier than using a package designed specifically for that application. This can solve some other problems too. For example, you might not want to spend the money for an extra package. Or maybe nothing you've seen fills the bill.

We at *Personal Computing* discovered the package-stretching phenomenon when we were trying to find a way to get prepared files into our company's typesetting computer. That computer had a modem so we figured we could send our files into it by telephone. There were a lot of problems, but we did find out that a word processor will send text over the phone lines. All you need is an acoustic modem. The procedure works like this.

Prepare your document and get ready to transmit it. In our case, that meant getting the text we wanted to transmit into the word processor's text buffer. Then call the receiving computer, and place the phone into the acoustic coupler when you hear the tone from the receiving unit. Tell the word processor to print the document.

Here's the interesting part. The computer will print when you tell it to. All it needs to know is the location of the printer. If a modem happens to be connected to the place where you tell your computer a printer is, the computer happily "prints" on the modem. The modem sends information to the other end of the phone line where the other computer gathers the data and does with it whatever it is supposed to do.

Obviously, you need a modem operating in originate mode so it knows to send its carrier signal over the line. It's easier to do this with an acoustic coupler than with a direct-connect modem, although it does work with some word processors coupled with specific modems. There you have to get out of the word processor, activate the modem, get back into the word processor, and then "save" the file to the modem. With an acoustic modem, some of these gyrations are avoided.

Just a little more reach

This is a simple example of stretch computing. Any time you do something with a computer and associated program that's beyond the original scope of the program, you're doing stretch computing. It may be fairly difficult, or it may be very simple—just a new twist no one else has thought of.

Take Judith Schwartz, for example, who works in the sales department at Apple Computer. We would expect she has access to almost any kind of word-processing program that runs on Apple computers. Yet, for one special application, her department uses VisiCalc as a word processor.

"We prepare demonstration and training tools," says Schwartz. "We need to get information into three columns on an 11-inch sheet of paper. We couldn't find a word processor which would cover that width of paper and still allow us to use the columnar format easily. So we tried VisiCalc.

Master
Program 1.1

illustration by Dave Pauley

"We set up the program with columns 30 characters wide. In the first column, we have to use two adjacent cells because the information is so wide. So we have to skip to the adjacent data cell. If we had Advanced VisiCalc, which lets you use variable column widths, we wouldn't have that problem."

Jeanne DuPreau is one of the people who does the actual data input. "We found it's really easy to use the program this way," she says. "When we used a word processor, we couldn't use the columns easily and still go past 80 columns. When you delete something on a line, the line fills in for the delete characters. That messes up column alignment, and then you have to go back and realign everything. VisiCalc doesn't do that, so it's a lot easier. Also, some of the columns have to be right justified, and some left justified. The format command lets you do that easily."

Adds Sue Crissman, another training-aids writer, "Skipping to adjacent cells seems like a problem, but it really isn't. We just use the right-arrow key. Once you get used to it, it's much faster than using a word processor. And the printing is another advantage. We can print one column at a time."

"People are horrified when we say we use VisiCalc as a word processor," says Schwartz, "but we found it works just fine for this application. Lots of people can benefit from simple things like this."

Accounting made simple

That doesn't sound like a very tough thing to do. The stretch in this instance came in breaking the mind set. You want to do word processing so you buy a word processor. Well, maybe not.

Do you need an accounting package to do accounting on your personal computer? Maybe not. Marti Manson, the director of the San Jose (Calif.) Museum of Art, found out she didn't need one. She raised stretch computing to new heights by combining an Apple /// with Apple Writer III, VisiCalc, QuickFile, and Business Graphics to design a business-accounting system for the museum.

"We're a non-profit museum," says Manson, "so we really can't afford to spend a lot of money on computer equipment. We were fortunate to have Apple donate an Apple II, and then an Apple /// and the software. They have made us a lot more efficient."

Rose Pantoja is the museum's computer expert. "We had to adapt the Apple equipment to fit our needs," she says. "For example, we use VisiCalc for all our financial work, like accounts payable and receivable. We can do anything with this program that you can do with paper and data arranged in columns and rows. In the past, it took our bookeeper three days to generate a set of financial reports. Now she can do it in about half an hour.

Pantoja says the museum bookstore uses VisiCalc to do its inventory. Items sold are posted into another template and the program, using its recalculating capability, automatically deducts the amount sold from the total on hand, generating a new total. This procedure makes it easy to tell when a new order has to be placed. The inventory template is one of several the museum is using right now. Others include accounts payable, accounts receivable, budget, monthly balance sheet, monthly receipts, and monthly disbursements. But that's not all the museum staff has been able to do with its small setup.

"We use the Apple Writer program to do our annual reports," says Pantoja. "The nice thing about it is that we can merge files from our VisiCalc and QuickFile into the word processor. We keep our inventory of display items on QuickFile, for example, and it's easy to incorporate this inventory into a report using the file merge capability. We can put our budget figures there, too."

The museum staff uses QuickFile for normal data-base applications, like keeping track of the museum's membership file, and the people who attend its art classes. Form letters are generated from these files when it's time to renew memberships, or when new people join and are sent notes of thanks. When the museum puts on a special show, for which people donate items to be put on display, QuickFile generates the wall label—a small card placed near the item showing the size of the painting, its artist, and owner.

Stretch computing doesn't have to require a lot of programming. As we've seen, it can be as easy as thinking of new and innovative ways to use something you already have. But it isn't limited to that.

Stretching data-base managers

Bruce Hutcheon is a musician whose interest in computers grew out of his experience with synthesizers and computer-generated music. Now he's the vice president of programming for a small consulting company which develops communications systems for banks. These systems are minicomputer-based, so the firm, New York-based Synergistic Communications, had no experience with personal computers until recently, when Hutcheon started talking to his father who's in the propane business.

"My dad works for Burn Well Gas in upstate New York," says Hutcheon. "He's the plant manager of one of several affiliated plants spread over a large geographic area. They thought they should computerize their operation, and went to several traditional manufacturers of distributed systems. IBM talked to them about a System 34 which would have cost them about $175,000 with all the hardware. They could have justified this cost, but I just thought there was a better way, so I got involved."

After investigating and nego-

Stretch computing can be
as easy as thinking of
new ways to use what you have.

tiating with the gas company, Hutcheon's company agreed on a price to set up a whole system using IBM Personal Computers. "The system IBM had proposed involved using a computer at a central location, and hooking up terminals at the various plants through leased lines. I thought it could be done with a stand-alone system at each plant. The more I thought about it, the more I got sucked into doing the job.

"Once I had decided on the hardware configuration, which would include a Corvus hard disk with either the multiplexer or OmniNet, I had to decide which language to use. It was pretty much a toss-up between languages—we looked at BASIC, Pascal, even COBOL. Then someone showed me what could be done with dBASE II. I went into a Computerland (in Brussels, as it happens—at the time Hutcheon was shuttling between Europe and San Juan, Puerto Rico working on an international private network for a bank), pulled a dBASE II package off the shelf and sat down with it for an afternoon." That's when Hutcheon decided to use this program as the basis for the system.

A sophisticated data-base management system dBASE II runs on CP/M systems and on the IBM Personal Computer under MS-DOS. It includes a kind of programming language which allows the user to get at his data in a variety of ways. The programming capability allows the user to generate automatic input and output structures which would otherwise have to be done interactively—manually specifying search keys to search through the data base, for example.

When Hutcheon decided to use dBASE II it wasn't yet available for the IBM, so he had to get the Zedex Baby Blue CPU, a co-microprocessor for the computer which included a Z80 microprocessor and 64k of RAM.

Using dBASE II Hutcheon devel-

USING VISICALC AS A WORD PROCESSOR

We were so intrigued with Jeanne DuPreau's description of using VisiCalc as a word processor we decided to give it a try. We can report that it works, and that it does give some formatting capabilities which are difficult to get with a word-processing program.

The printout shown here is a modification of the instructions Jeanne wrote for her co-workers at Apple. Those instructions were very specific to her application, while ours are of a more general nature.

The only thing we don't say in our instructions is how you would set up the printer interface for printing your files. In this example, we used a Mountain Computer CPS Multifunction card as our parallel interface with an Epson MX-80 printer assigned to a phantom slot #1 in an Apple II Plus. (That's why the printer output is all uppercase.) DuPreau and her counterparts use Apple ///s, with 80-column, lowercase displays.

In preparing this printout we found we had to get into the SETUP program for the Mountain card to reset the line-feed and the line-length parameters. Otherwise, that card just ignores all instructions VisiCalc sends for printing. Then we were able to use the setup string in the VisiCalc PRINT command to make the MX-80 print 132 columns, in condensed-print format.

If you have a word-processing application which requires the use of a columnar format, this program works. Presumably, it will work with any spreadsheet program.

```
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            OF USING VISICALC AS A WORD PROCESSOR

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                  BENEFITS NOT NORMALLY AVAILABLE.


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WANT

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                                     RETURN

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COMMAND, LIKE THIS                   PRINTRETURN OR, /PP, "CI8ON OR
                                     OTHER SETUP STRING TO SUPPRESS
                                     LINE FEEDS OR SET LINE LENGTH
                                     THEN LOWER RIGHT CELL TO
                                     PRINTRETURN


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     YOU CAN MAKE    L) COMMANDS FOR       JUSTIFY IF YOU WANT
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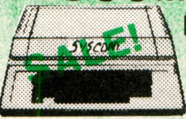

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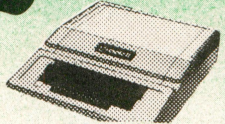

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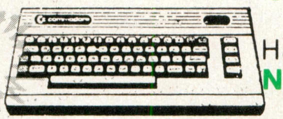

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Stretch computing is an idea whose time has come.

oped a general accounting system for the propane plants that are affiliated with Burn Well. The system is now in use at one of the plants, where it's been running parallel with the plant's manual system, just to make sure everything is OK before turning over operations to the computer. The program is a complete accounting system—it keeps the customer file; handles accounts receivable; maintains delivery schedules; prints delivery tickets in the order in which a driver will make deliveries; prints billing forms; and maintains a gas-in-plant inventory, a parts inventory and an appliance inventory.

The gas companies distribute their product in different ways. Some customers are on gas meters, others get their deliveries from a bulk tank truck. Some people come to the plant and exchange propane cylinders, while others have cylinders delivered. The plants also sell furnaces, stoves, and other appliances, as well as spare parts. All these inventory items, as well as the gas itself, have to be tracked. One program on the IBM Personal Computer (the hardware for one installation, two computers, the hard disk, and network connections cost less than $15,000 list price) does the whole job.

"The first thing to be done," Hutcheon says, "was to determine what had to be done. It's amazing how many people don't know or can't tell you what they do, even though they've been doing it for years. They haven't conceptualized the job. So I had to spend a lot of time finding out just what the system would entail."

The dBASE II programming language, Hutcheon says, is similar to BASIC in that it has high-level syntax and it's interpreted. But there are commands built in that allow simple file manipulation. "It lets you do the things you have to do with a database system," he says. "You can use it strictly as a data-base utility, or you can program it."

Since Hutcheon decided that the whole system would revolve around the accounts-receivable file, he designed that file first. All it required was determining what information would be kept where in the file. Hutcheon says dBASE II uses files as one class of storage, and records are the subclass of storage on the system. So designing the accounts-receivable file was tantamount to designing the records.

Easy access

After designing the accounts-receivable file, Hutcheon designed the transaction file. Both these files are indexed, which makes them easy to access. An index could be a name, for example, or a date. When you're looking for a particular transaction for a certain customer, you simply tell dBASE II to look for that customer name. It searches through a separate keyword file for the name in question. The name in that index file "points" to the record of that customer, so the program doesn't have to search through the big file. Once it's found the pointer it's looking for, it can go directly to the record in question. It's faster than a sequential search through a large master file. One of the reasons Hutcheon chose to implement this system on dBASE II was its ability to use this kind of file without a lot of complex coding.

"Everything else hangs on those files. So the next thing I did was divide the problem into small procedures, and code those procedures in dBASE II's programming language. I used a procedure something like flow chart although it isn't really that, to define the smaller problems," Hutcheon explains.

Hutcheon says anyone can develop a system similar to his, providing the thought process is both logical and sequential. "There's nothing too different about dBASE II compared to other programming systems," he says. "It's just sloshing files back and forth, and doing something if this number matches that number. It's very good for doing an application you can't get off the shelf, if it's a single-user application." What dBASE II does provide, he says, is easy file handling.

Stretch computing is an idea whose time has come. From the earliest days of the personal computer, people who wanted to do something else with their machines have been figuring out ways to get it done. Now, the applications programmers have given us some very powerful tools to accomplish more than even they thought possible when they wrote the program. Certainly VisiCalc's developers never envisioned its use as a word processor. And Judith Schwartz, who uses it for just that application, says people cringe when they hear what she's doing with the program. But that makes no difference, as long as the computer is doing what it's supposed to do—increase her productivity.

It's well known that computers can save time and money. Rose Pantoja is proving that again every day as she keeps the San Jose Museum of Art's bookkeeping on course.

Bruce Hutcheon found that a database manager is flexible enough to be tailored into many shapes, depending on how you use its built-in power.

In fact, that's the common thread in all these stories—the ability to think. If you're willing to think in a different way, to fly in the face of conventional wisdom, you might come up with a program application which will make your job a lot easier. If you can think of your problem in a new light, perhaps you'll be able to devise a way to use compatible software packages for a completely new application, the way the San Jose Museum of Art did. If you can think in a logical manner, you could tailor a data-base manager and end up with something radically different.

Creative thinking will stretch your mind—and your computing—and let you keep on doing things differently, and better.

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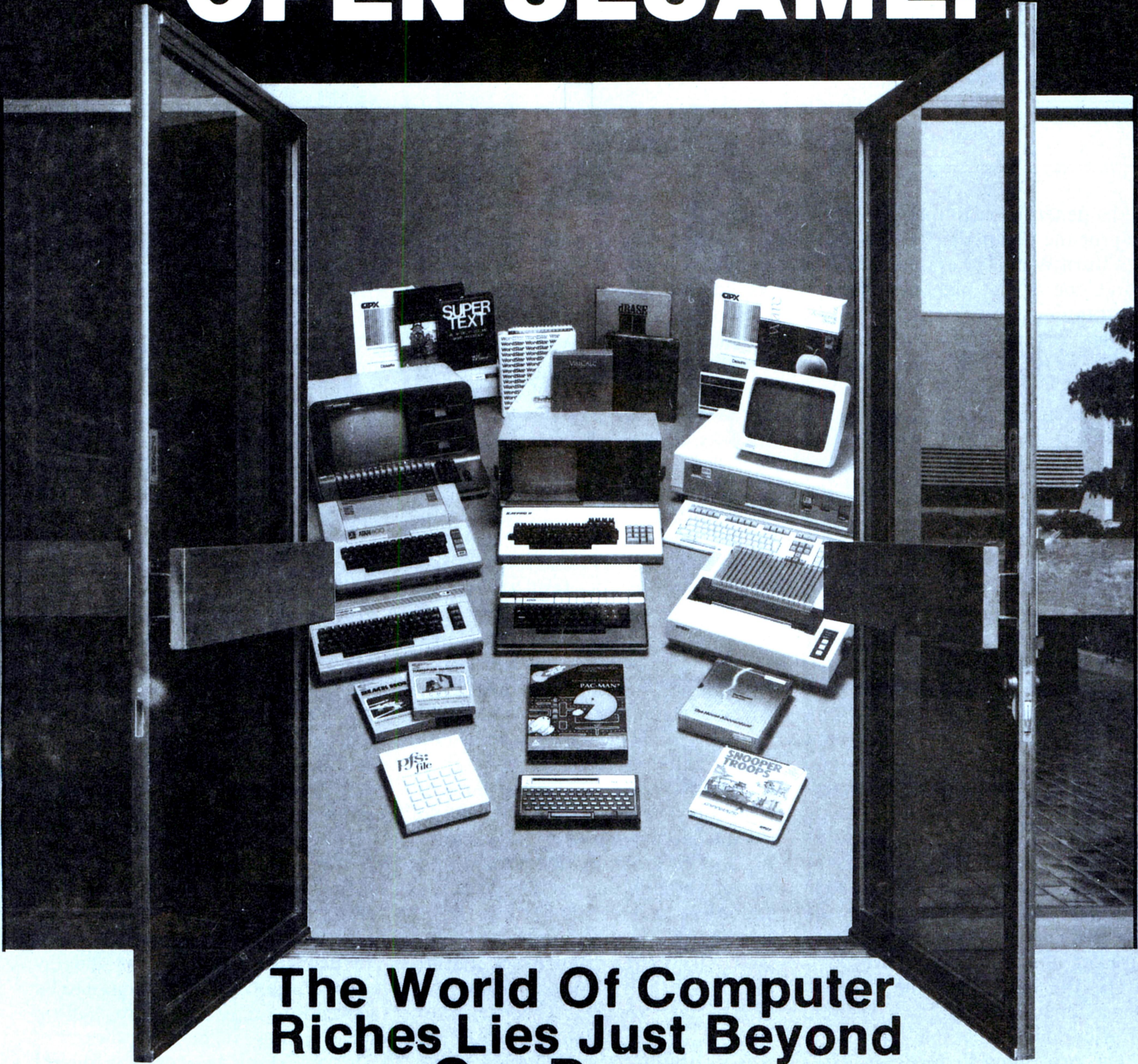

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CIRCLE 38

Portable Power

For the traveling businessman portable computers are the way to go

by Charles Rubin

When Adam Osborne introduced his Osborne 1 portable computer back in May of 1981, it represented a significant step forward in the development of personal computing as an indispensable business tool. For the first time, it was possible for an executive or manager to leave his office carrying nothing bulkier than a medium-size suitcase and arrive at his destination armed with not only the power and leverage of a sophisticated personal computer, but all the data he would need on disks which fit into a small slot under one of the computer's two drives. And by the simple expedient of adding a modem, he need never be farther than a telephone call away from the combined power of the computers and data banks back in his office.

The problem was, hardly anyone paid any attention—or so it seemed. But by the end of 1981, there was a three-month backlog of orders, and when the year-end sales numbers were tallied, some 40,000 people had agreed with Osborne that portable computing was an idea whose time had come.

Portability wasn't the only reason the Osborne 1 was such a success. It was every bit as much a marketing triumph as it was a technological advance, because inherent in its design was the realization that buying a computer was not a single decision, but several decisions. The Osborne 1 resolved those decisions in advance by including everything necessary—except a printer and modem—right in the case. VisiCalc, WordStar, and CP/M were all there. And the whole package was cheap enough to charge on Mastercard or Visa.

photos by George B. Fry III

Portable computers are coming into their own as more executives rely on them for computing power away from the office.

Portable computing power had become part of the American landscape, and Leo Grandi was one of the business pros who saw its potential early on.

Grandi, a San Francisco-based administrative consultant, is in the business of setting up computerized timekeeping and billing systems for law firms. One of his biggest challenges is convincing lawyers of the cost-effectiveness of computers in business applications. Grandi was quick to realize that with a portable computer, he could let the technology speak for itself. He ordered one of the first Osbornes (his is serial number 27) and began taking it around to his clients.

"Many law firms are still doing their accounting work by hand," he says. "Some firms that have been around 20 or 30 years have never had a budget. With my Osborne, I can take the computer right to their offices and show what automation can do for them."

Grandi often recommends a software package called LexIntellect, which runs under CP/M on Z80-based personal computers. The software is designed to handle timekeeping and billing for attorneys. "When I can show attorneys a package like this, one that's tailored to their needs and has plain-language prompting, they don't find it so difficult to switch over to a computer." He points out that with the LexIn-

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Charles Rubin is a free-lance writer and long-time observer of the personal-computer industry.

tellect package, a relatively minimal investment in a personal computer can solve the accounting problems of up to a dozen attorneys in one firm.

"I use the SuperCalc program that came with the Osborne for budgeting work," Grandi says. "I set up expense categories for clients to show them where their money is going, and how they can cut waste by making a few spending changes. Before I had SuperCalc, it took too long to manipulate budget categories with paper and pencil. It was too expensive for me to spend all those hours changing the numbers by hand. Now, I can bring up a spreadsheet on the computer and demonstrate instantly how changes in one category affect the other parts of the budget."

Grandi uses WordStar to write and edit reports for his clients. "I've used a modem, too," he says. "I had one client who was implementing a time-share billing system, and I wanted to monitor their entries to the time-share service to make sure they were doing it right. With the modem, I could monitor the client's entries from my own office instead of going to theirs."

In his own office, Grandi finds that the portable increases his productivity. "I'm about 40 percent faster with it," he estimates. As for spreading the use of personal computers to law firms, he says, "So far, the results have been very positive."

Out-computing the competition

There's a lot of competition among manufacturers' representatives, so Mickey Fox uses her portable computer to get the upper hand. Fox represents two furniture manufacturers in a territory covering most of northern California. When Fox goes on the road, her Osborne goes with her.

"With the Osborne," she says, "I can offer services my competitors can't. I use SuperCalc on sales calls to compute various pricing options for my clients. I enter the dealer cost and various retail prices of an item, and show the markups at each price. It helps the client decide what to charge." Fox also uses SuperCalc to isolate buying trends for her clients. "The average customer carries three to 10 styles of sofas, for example, in as many different colors and fabrics. I can input the history of their account and determine which colors and styles are selling the best."

At the moment, Fox has to enter buying histories manually when she wants to track buying trends, because her files are only set up to store current orders. "At this point I have to take the computer into my hotel room at night and input the buying history to make the calculations. Then I show the results to the client the next day." Fox is currently having her

For many, the portable computer has become a second briefcase, another box of essential day-to-day information.

courtesy of Bill Blumel/Computerland, Burlingame, CA

"With the Osborne, I can offer services my competitors can't."

dBASE II program modified to allow ongoing storage and retrieval of historical information on each of her 125 accounts.

"Many of my clients don't have computers at all," she says, "and they're impressed when they see what you can do with them. With new clients, Fox does a presentation of the computer's capabilities to emphasize the competitive edge she has over other manufacturers' reps.

In addition to SuperCalc and dBASE II, Fox uses WordStar to write sales letters and memos. "I didn't know anything about computers when I got the Osborne," she says, "but I joined FOG (First Osborne Group) and they were very helpful. In fact, my dBASE II program is being modified by a FOG member." Fox says it took her about four hours to enter her entire customer list into the computer. When her dBASE II program is ready, Fox will be able to store all her records on diskettes, reducing her paper load significantly.

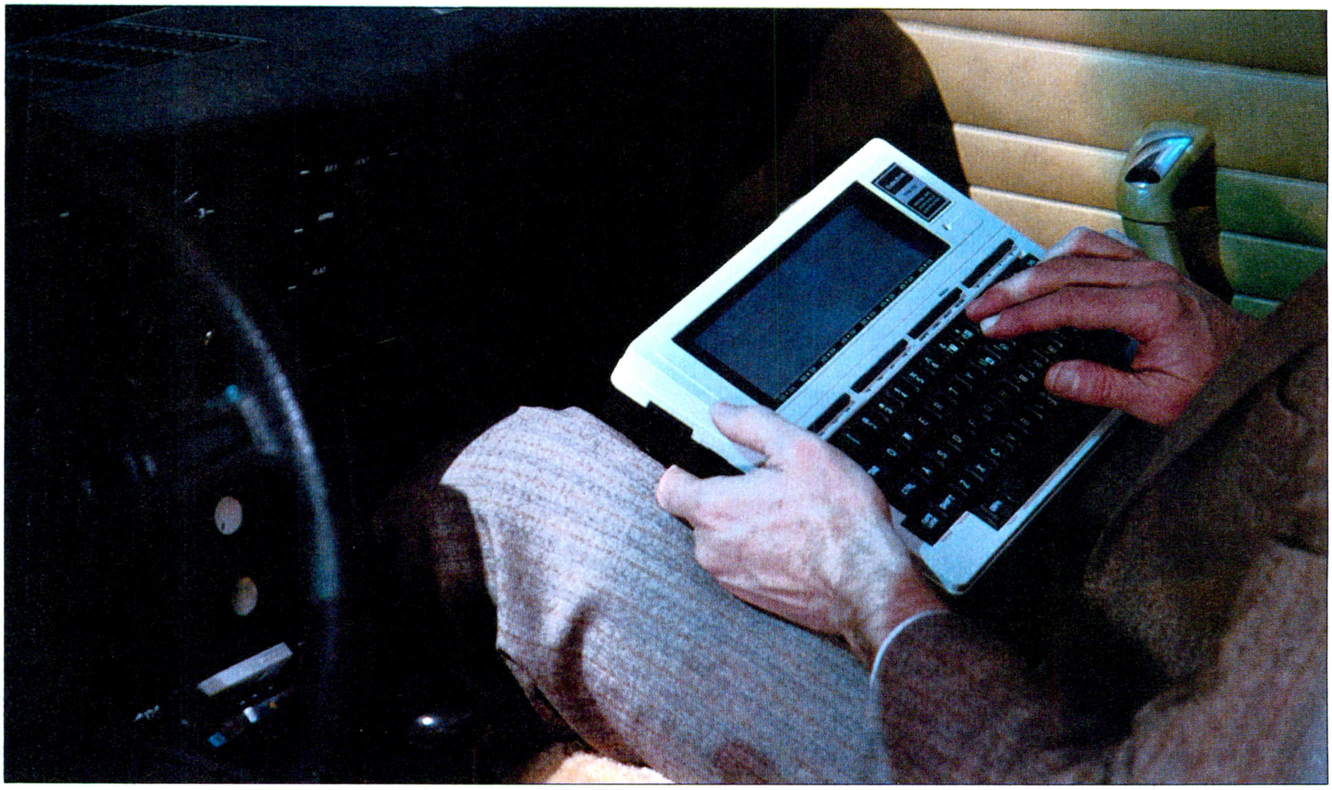
Portables for everybody

As it was with the first personal computers, the application of portable computers to individual needs has caught the eye of larger organizations. Corporate use of portables is giving organizations the same expanded flexibility enjoyed by individual portable-computer users.

As a vice president of the largest advertising agency in Denver, Collier Buffington's exposure to computers was limited to more or less traditional applications. "The accounting was done on a mainframe and the typists had word processors," Buffington says, "but all the creative and budgeting work was done with pencil and paper."

Leo Grandi, a consultant and one of the first Osborne owners, is spreading the word about portables to clients.

When he started his own marketing consulting and research firm, Buffington was determined to computerize every facet of his operation. He discovered that portable computers were the most effective solution to his needs. "I wanted to put the tech-



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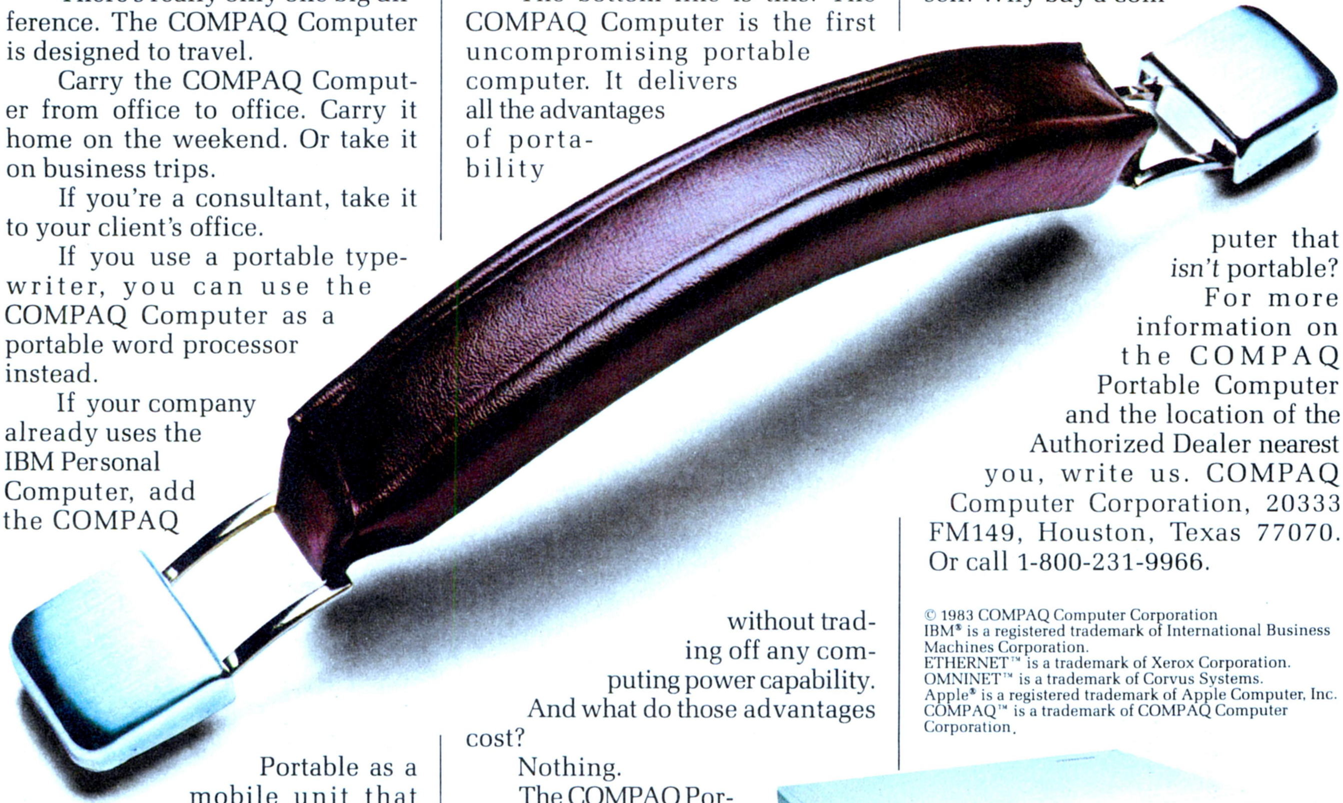
If your company already uses the IBM Personal Computer, add the COMPAQ Portable as a mobile unit that can use the same programs, the same data disks, and even the same user manuals.



There are more programs available for the COMPAQ Computer than for any other portable. More, in fact, than for most nonportables. You can buy them in hundreds of computer stores nationwide, and they run as is, right off the shelf.

With most other portables you'd probably need to buy an additional display screen because the built-in screen is too small for certain tasks, like word processing. The COMPAQ Computer's display screen is nine inches diagonally, big enough for any job, and it shows a full 80 characters across. And the built-in display offers high-resolution graphics and text characters on the same screen.

The bottom line is this. The COMPAQ Computer is the first uncompromising portable computer. It delivers all the advantages of portability without trading off any computing power capability.

And what do those advantages cost?

Nothing.

The COMPAQ Portable sells for hundreds less than a comparably equipped IBM or APPLE® III. Standard features include 128K bytes of internal memory and a 320K-byte disk drive, both of which are extra-cost options on the IBM. Memory and additional disk drive upgrades are available options to double those capacities.

In the standard configuration, the COMPAQ Computer has three open slots for functional expansion electronics as your needs and applications grow. It accepts standard network and communications interfaces including ETHERNET™ and OMNINET™.

If you're considering a personal computer, there's a new question you need to ask yourself. Why buy a computer that *isn't* portable?

For more information on the COMPAQ Portable Computer and the location of the Authorized Dealer nearest you, write us. COMPAQ Computer Corporation, 20333 FM149, Houston, Texas 77070. Or call 1-800-231-9966.

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COMPAQ™
PORTABLE COMPUTER
The most computer you can carry

The success of portables has encouraged expansion of the portable computer industry.

nology into everybody's hands," he says. He accomplished this with the purchase of five Otrona Attaches.

"I bought the first Attache last June. I used it for writing and research work, and I was getting things done about 40 percent faster than I had before. I also like to work at home, and it's a lot easier to carry work back and forth with the Attache."

The purchase of four more Attaches has extended these advantages to the rest of Buffington's staff. "You can come into the office any night," he says, "and you won't find any of the Attaches here—they all get taken home. Our people are highly motivated. They're used to taking work home. With the Attaches, they get the work done a lot faster and have more leisure time." Three of the machines are used by a copywriter, an accountant, and a market researcher. The fourth machine is a "floater," shared by the media and production departments. "It moves up and down the hall quite a bit," Buffington says.

Text-oriented work is done with WordStar Plus, and statistical analyses are performed with MultiPlan. Modeling and market research are accomplished with dBASE II. There are also modems and telecommunications software for each portable.

The telecommunications link enables the research department to access data bases such as Dialog, CompuServe, and The Source for statistical abstracts used in market research. The modems also permit electronic mail transmission between staff members in various locations. "One of our people is home right now with a broken leg," Buffington points out, "but he just does his work there and sends it in over the phone to another Attache here." Two research associates in another office have linked their IBM Personal Computers to an Attache in Buffington's research department to send and receive data.

Buffington says portable computing has had two significant effects on his organization: faster turnaround and lower overheads. "With the text processors, our people can correct their own reports and letters and then print them out without a typist or secretary. That not only saves a step in the turnaround process, it also eliminates the need for clerical support personnel." He points out that other firms like his have two or three secretary/typists to support the staff. His organization has none. "With everyone using a computer and sharing three printers, there's no typing to be done. And since our files are kept mostly on diskettes, we don't need a file clerk."

When his Attache isn't moving between home and office, Buffington sometimes takes it on client presentations. Instead of wrestling with a bulky printout, he can retrieve specific research data quickly and easily.

Buffington is pleased with the power of portables, but now he wants to expand their capabilities even more by setting up a local area network to tie them all together. "I'm looking at systems like the Corvus Omninet, which will allow major functions like accounting to be centralized." Such a network would allow each Attache to link up to a central office data base containing office files. Once this is accomplished, a staffer with an Attache and a modem will have virtually the entire information resources of the firm in one portable 18-pound unit.

Less is more

The success of portables like the Osborne, Kaypro, and Otrona in large and small organizations has encouraged expansion of the portable computer industry. There are now over a dozen portables being marketed to banks, insurance companies, factories, and research laboratories. And as early qualms about small display sizes and limited on-line storage have disappeared, a new generation of portable computers has appeared. Using technological advances like bubble memory, flat-screen LCD displays, and long-lasting, quick-recharging batteries, the new ultraportables are going places where the early portables couldn't go.

Mickey Fox, a furniture sales representative, takes her Osborne on sales calls to keep clients aware of pricing trends.

Foreign correspondent

Jack Swanson is the Pacific correspondent for the Seattle Post-Intelligencer. His job frequently takes him to Singapore, Hong Kong, Tokyo, and other places throughout the Pacific Rim. Not long ago, Swanson retired his reporter's notebook and replaced it with a Hewlett-Packard HP-75 hand-held computer. The 1½-pound unit serves as his address book, notebook, and typewriter.

"It's really more versatile than I thought when I got it," Swanson says. "The keyboard is smaller than a normal typewriter's, but I can touch-type on it anyway. I use the computer to take notes in interviews. I can set it in my lap and type without losing eye contact with the other person. It's also a little faster than hand-written notes.

When it's time to write his story, Swanson uses an HPIL 24-column, dot-matrix printer to provide a copy

(continued on page 93)

VISIBLE VISICALC ON A ONE-LINE DISPLAY

You can put a Hewlett-Packard HP-75C Portable Computer into your briefcase—it's only 5 by 10 by 1¼ inches. And you can put VisiCalc—the famous electronic spreadsheet program—into a 75C, just by popping a tiny (2 by 1 by ½ inches) solid state cartridge into one of the 75C's' three cartridge slots. But how do you see your VisiCalc worksheet on the 75C's 32-character one-line display?

The secret is context. The rows and columns of VisiCalc spreadsheets generally relate financial factors (rows) to time factors (columns). Each row and column has a descriptive heading and a number or letter designating its position. So the meaning of each cell comes from its context—the value of a given financial factor, determined by a given formula for deriving that factor, shown for a particular point in time.

So whenever you look at a particular cell on a physical spreadsheet, you need to know what row and column intersect at that cell, what formula was used to determine its value, and the cell's current value. When you want to look at a given cell with HP-75 VisiCalc, you move your one-line "window" to the cell in question with cursor control keys or with a GOTO command specifying the cell's column and row.

The first thing shown in the window is either the appropriate column and row headings, or their position on your spreadsheet. You can choose either display, and alternate between them at the touch of a key. The second thing in the window is either the formula or the value of the cell—and again, you can switch back and forth between these. This makes a total of four ways you can look at any given cell, depending on your preference. Hit another key and you're back on the command line, ready to use any of the processes common to spreadsheet analysis programs. Four programmable function keys on the 75C allow you to use the different VisiCalc functions rapidly.

Also, you're not limited to the one-line display. You can get a 32-character by 16-line display on a monitor or television set with a $295 Video Interface box, which is sufficient to show up to five VisiCalc columns and 14 rows, with the 75C's own display being used to enter new values and formulas. But the miracle is how well the 75C lets a user work with VisiCalc away from his office or hotel suite, on that one 32-character line. And you can print out spreadsheets on a small accessory printer, as well as saving them on an accessory cassette machine.

BUDGET
HEWLETT PACKARD
82912A MONITOR
82905B PRINTER HEWLETT·PACKARD
>January^Income:2000

The portability of the HP-75 enables Swanson to use it on airplane flights.

(continued from page 91)

of his notes. Even though the text-formatting software for the HP-75 wasn't available at first, Swanson said the unformatted notes were still easier to read than his handwriting. While overseas, he can print out a finished story 24 columns wide and then give it to a Telex operator to transmit to the newspaper's mainframe computer in Seattle.

When it becomes available, Swanson plans to use an RS-232-C interface to hook a modem to his computer. "Once we work out the software," he says, "I'll be able to transmit directly to the paper's computer, bypassing the Telex operator." Being a relatively new product, the HP-75 has a limited software base, but Swanson found he could write simple programs in BASIC with the aid of the computer's user manual. "The manual was very helpful," he says. "It had a lot of sample programs you could do to get the hang of it." So far he's written the address-book program, which allows him to call up a separate file of names and addresses for each area he's traveling to; a tax data program to help him compute his taxes; and a babysitter's note program that allows him to compose custom notes to different sitters telling them his location, phone number, and when he expects to return.

Prospective users of HP-75s may find the limited on-line storage (24k RAM) a drawback, but Swanson says it hasn't bothered him. "There's a built-in magnetic card reader on the computer," he says, "and if the memory fills up I can dump it onto mag cards. I carry about 100 cards with me when I travel."

The computer, printer (which weighs 1½ pounds), and magnetic cards fit easily into Swanson's shoulder bag. The unit is rugged and small enough to work anywhere. Although the LCD screen displays only 32 characters, it can scroll across a 96-character line. "If I want to see a whole page of text," Swanson says, "I can use one of the built-in hookups to connect the computer to a monitor or a regular television."

The portability of the HP-75 enables Swanson to use it on airplane flights. "I pulled it out to work on a story coming back from Japan," he recalls, "and suddenly there was a crowd of people around me, watching. Everybody was fascinated." Some of the onlookers turned out to be other journalists whose remote telecommunications terminals and portables had to be stowed away in flight.

Taking it to court

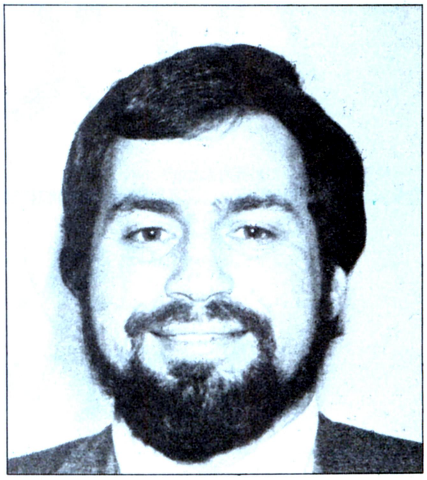
Jeffrey Allen's law office had been using a TRS-80 for accounting, and for accessing a legal data base for several months. And he'd used an Apple II at home for about a year before he decided to venture into portable computing. "Let's say it's an experiment I have a lot of faith in," he says.

Last summer, Allen persuaded his partners to buy an Otrona Attache portable computer for "litigation support." The experiment involves taking the Attache into the courtroom to provide fast, easy access to documents during a trial.

We haven't actually taken it to court yet," says Allen, "because our first computer-supported case hasn't come to trial." The firm has been storing case documents in computer files since last fall, but the business litigation cases handled by Allen's firm take from 1½ to 2 years to come up. He hopes to give the Attache its debut in Oakland courtrooms by the end of this year.

"For now," he says, "our staff inputs the document summaries into the computer files. When I want to work on a case at home, I can take the Attache and a couple of diskettes, instead of several boxes of papers."

Allen uses a modified version of dBASE II to manipulate case information. "If, for example, I want to pull information from every document that relates to one specific issue in the case, it's easy on the computer. Most deposition summaries are in simple chronological order, so when I wanted an issues-oriented summary it meant cutting and pasting the document or retyping it. With the computer, I can rearrange the documents and print them out any way I want."



Attorney Jeffrey Allen plans to use an Attache portable computer in the courtroom to access case documents during trials.

Allen did the dBASE II modifications himself, and admits the process was time consuming. "When you computerize a procedure," he says, "there's always a big front-end time investment. For a while it seems a lot slower to do the procedure on the computer, because you're getting used to it. But once you've got the bugs out of the new system, you save a lot of time."

When he's not tinkering with dBASE II, Allen uses the Attache's WordStar Plus software to write memos at home or at the office. He has a printer at each location.

Will the experiment be a success? Allen thinks so. "The more information you've got and the quicker you can get to it, the better the quality of your work will be." It's a statement that will be echoed by more and more people as they discover new applications made possible by portable computers.

Simplicity Accounting™

Easy. Fast. Accurate. And very very friendly.

Hayden's Simplicity Accounting software is a natural extension of your bookkeeping system. All the advantages of computer technology with the simplicity of a manual method. No hassles. Just great accounting software for your small business.

Hayden's easy-to-use programs are designed for the company just beginning to use computers for financial tasks. They operate like a manual or ledger card system but with the speed, accuracy and auditability of an automated system.

You perform one transaction at a time, while the software does all the calculations, updates records and prints totals in seconds. Instructions are displayed "menu-style" on the screen in a clear, uncomplicated fill-in-the-blank format that keeps the whole operation extremely simple.

This friendly new software was written by people who have worked with small businesses for many years. It offers all the features your small business needs in a no-nonsense, straightforward set of programs that is efficient and inexpensive. Also, Hayden's Simplicity Accounting bookkeeping systems are fully integrated and run under the popular CP/M* operating system.

Easy to Use

You'll be able to use Simplicity Accounting software as soon as you get it back to the office. It is easy to learn because it does bookkeeping the way you've always done bookkeeping: just call up a file and record your transactions; enter payments, debits, payroll information, inventory data. Then put it away and go onto the next. That's it. No batching problems. No hassles. In fact, Simplicity Accounting uses the same "enter-it-process-it" approach that small businesses have used to keep their books since long before the computer came around. No disruption in your office procedure. The way you've always done bookkeeping, only faster, better and much more accurately.

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Simplicity Accounting gives you management information almost impossible to get from a manual system. And it is accurate, up-to-the-minute information, available now so you can make critical business decisions with all the facts. Control cash flow, analyze sales, avoid stock outs, monitor the pulse of your business.

The Simplicity Accounting System

General Ledger

The General Ledger module has two distinct parts: General Ledger posting with related reports, and Financial Statements. It can be used with the other programs in the family or as a free-standing system. And it is very flexible so you can easily tailor it to your specific needs. In addition, the General Ledger module can be used as an excellent client writeup program for a small accounting or bookkeeping service.

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- System allows department profit analysis and consolidation.
- System can work with a 12 or 13-period year.
- Comparisons can be made against last year's figures or against budget, in percentages or as dollar variances.
- Report formating is accomplished through separate format records.
- Custom reports to prepare various journals.

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A fast, high-volume, easy to use debit/credit posting system to replace manual "peg-board" systems or bookkeeping machines. Combines simple operation with sophisticated capabilities. Automatic General Ledger integration is optional.

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- Open-item inquiry and statement preparation.
- Automatic finance charges applied to all or selected accounts.
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An effective way to manage cash requirements. For businesses on a cash basis, accrual basis, or combination. Automatic General Ledger integration.

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- Provision for operator override of all calculations.
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Stand-alone program gives management and purchasing personnel an up-to-the-minute analysis of inventory stock levels, product sales performance and profitability on an item-by-item basis. Provides tools to help keep inventory levels at a minimum while avoiding "stock outs."

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- Three sales prices stored.
- Items may be assigned either internal or supplier-generated codes.
- Can print physical inventory list worksheet.
- Actual inventory adjustments easily made.
- Inquiry on an item displays the whole record.

Order No: 208xx
Price: $449

It Grows with You

Start with any of the Simplicity Accounting modules and add others as your business expands. All are truly modular and integrate with General Ledger when you're ready. Begin with Receivables or Payables today and expand to Payroll or General Ledger tomorrow, or next month or next year. Simplicity Accounting is a bookkeeping system you can stay with for a long time.

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Simplicity Accounting systems do not stand by themselves. They are all part of the growing family of Hayden Software, designed, built and supported by a company with the experience and resources to give you more than just great accounting software. All Hayden software is fully tested and warranteed. User manuals are complete and thorough, 3-ring bound in a handsome, durable slip case. Training materials and menu screens get you up and running fast, and keep you out of trouble.

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HAYDEN **SOFTWARE**

How To Pick A Portable Computer

A buyer's guide to features and capabilities of portable and hand-held computers

by David Gabel, Senior Editor

Should you buy a portable computer? There are a couple of good reasons for answering that question with a resounding yes. But first—what is a portable computer?

Portable computers are any computers which are so configured that they can be closed up and put under an airline seat. When we say portable we don't mean hand-held. A hand-held computer is just that—a computer you can hold in your hand while you're working with it. While all hand-held computers are portable, not all portable computers are hand-held.

The new Access computer combines a printer and modem in its all-in-one package. The display is unique for portables: it's amber for reduced eyestrain.

Generally, portable computers provide more computing power, measured in RAM and ROM, than do hand-held computers, because the portable computers are bigger and have more room for memory than the hand-held machines. In fact, most portable computers can give their users as much computing power as a full-blown computer. And newer models incorporate printers and modems, providing a full computer system in a compact package.

There are at least two obvious reasons for buying a portable computer—portability and cost. Portability means just that—you can pick up the computer and carry it around which, in some cases, means cost effectiveness. In a company which

COMPACT COMPUTER 40

Although it has only a one-line display, the TI compact Computer 40 allows you to scroll up and down and left to right on an 80-column line, giving you a window on your data.

CASIO
GOTO FX-802P

Casio's FX-802P hand-held computer includes a built-in printer for recording data or programs. The machine uses batteries for its power supply, and has a one-line screen display.

Epson's HX-20 is a complete personal computer, less disk drives, despite the fact that it will fit in your hand. The four-line display scrolls so the user can look at a full line of text.

You can get the Osborne I with half-height floppy-disk drives, which put as many as four drives in a compact package. I/O ports are placed directly under the drives and screen.

needs computing, for example, but doesn't want to spend the capital required to equip everyone who could use one, portable computers could be the answer. When one employee finishes with it, the person at the next desk can use it.

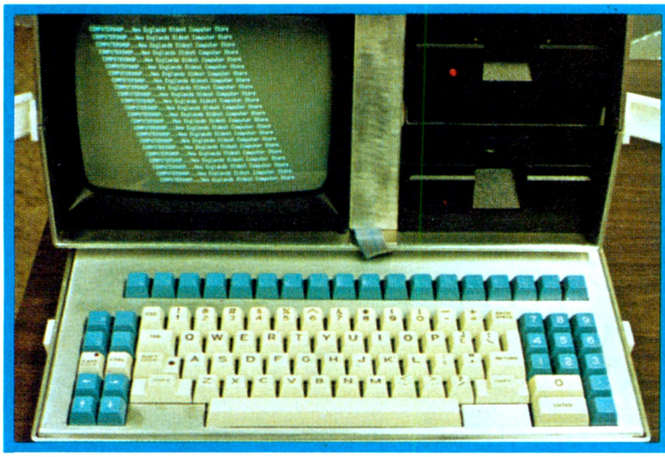
Another problem that can be solved by the use of a portable computer is the one of limited office space. Hardware designers are busy searching for ways to reduce the "footprint" of computing equipment on the top of the desk. A portable computer gets around this space squeeze because when it's in use, it can fit on top of an average-size desk. When it's not being used, it can be closed up and put away under a desk. The work space becomes available for other users. No special—and costly—computer workstations are necessary.

For many businessmen, carrying a portable computer into the field for reasons as varied as remote data gathering to sales presentations makes good business sense. Salesmen who need to compute away from the home office, say, can use a portable computer to enter order information and then transmit that information to the home-office computers. Or in the case of people who can't get away from it all, even when they are away from it all, portable computers are easy to carry along on a vacation or weekend excursion.

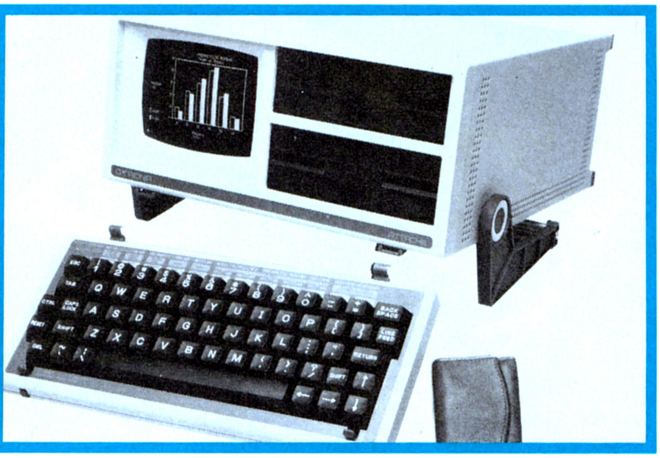
The other advantage of portable computers is low cost. Adam Osborne stunned the computer world two years ago when he introduced his

You can carry the Pied Piper with you on a trip, and plug it into a motel's TV set for a display—the rf modulator to make such a connection is already built into the unit.

The Compaq portable computer supports all IBM Personal Computer software without modification. None of that software is bundled with the computer, however.



The Starlite computer, of which the above is a prototype, is unique in that it uses the S-100 bus for added peripheral expansion. Four slots are also available for additional cards.



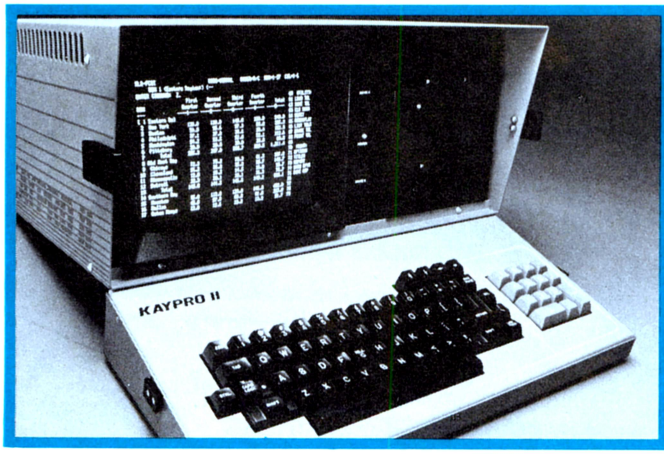
The Otrona Attache features a small video display and $5\frac{1}{4}$-inch floppy disk drives. Its package is one of the smallest of the portable computers on the market.

Osborne 1, which cost about $1800 including 64k of RAM, a CRT display, CP/M, and applications software (SuperCalc and WordStar with MailMerge). There are many stories around the industry about how the cost got to be so low, but Adam Osborne himself gave a few reasons at the 1982 West Coast Computer Faire. It was, he said, because the company knows how to buy in quantity, and how to keep manufacturing costs down.

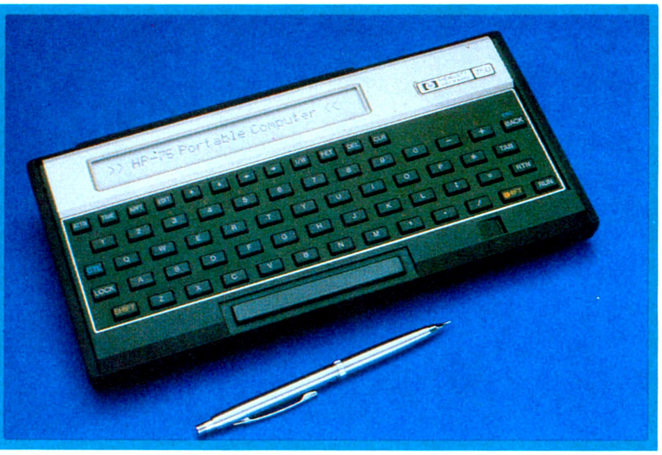
If that was the case, others learned quickly, because now a whole slew of new portable computers are appearing, many of them priced competitively with the Osborne machine.

In the case of almost all portable computers which aren't hand-held, you get a full working computer with keyboard, display, disk drive(s), and software. Newer portables, like the DOT from Computer Devices and the Access from Access Matrix Corp., also provide other built-in peripherals. Having said that, the generalities end, because portable computers are substantially different from each other. Some of them use 5-inch-wide displays; some displays are larger. Some of the computers have small keyboards while others use full-size Selectric-like keyboards. Certain models are supplied with the new micro-floppy drives, while others employ half-height $5\frac{1}{4}$-inch units. Some of the portable computers work off batteries; some require the presence of 110V AC. The variations are complex and important.

The variation among the software



The 9-inch screen of this Kaypro portable computer allows you to display more columns on your spreadsheet. The computer sports double-density floppy disk drives.



The HP-75C portable can be connected to a number of peripherals to create a complete portable computer system. The computer also interfaces easily to HP's Series 80 computers.

If you've decided on a portable, remember the need for data backup.

is as great as among the hardware. Some computers, like the Osborne 1 and the Kaypro II, provide CP/M-compatible software. Others, like the Compaq, use software compatible with the IBM Personal Computer. Unfortunately, in the case of the Compaq computer, while it will run IBM software, the software isn't included in the price of the machine. Nevertheless, programs for the Compaq and other IBM-compatible portable computers run under MS-DOS, an operating system that appears under a number of pseudonyms, but is the same operating system as PC-DOS, supplied with the IBM Personal Computer. Thus, some of the portable computers provide only bare-bones software, utilities, and the like, while others come "bundled" with full application-software packages.

Running software

The application-software packages are similar in function, so if you're considering a portable computer whose price includes application packages, you can easily compare the machines by sitting down at them and running the software. You might find you prefer Perfect Writer, available on the Kaypro II, to WordStar, available on the Osborne. That makes your choice of portable computer relatively easy, if the available software is the only variable you're concerned about.

But it probably won't be. One area of contention in portable computers is the display. Some people find the 5-inch CRT of the Osborne computer a bother; others don't. Tom Hayes, a marketing manager for Osborne, says the company has addressed that problem by providing the capability to plug in an external monitor which gives access to a full-size display. "But" he says, "I have an Osborne 1 on my desk, and I don't find the small display a problem at all."

Indeed, one staffer at *Personal Computing* uses an Osborne 1 for all his work, and he reports he quickly got used to the small display; it doesn't bother him at all. He could use the larger monitor, but he sees no real need for it.

Still another variable is the storage capacity available on the computer. Some portable computers provide you with one or more single-sided, single-density disk drives. The capacity numbers quoted for these drives vary. But generally, such drives will store fewer than 200k on a single disk. Providing a single-sided, double-density drive will double the storage per disk to about 400k. Kaypro, which provides the single-sided drives on its Kaypro II, quotes 191k for each of the drives. When you're comparing capacity figures, by the way, make sure you're talking formatted capacity. This is the data capacity of a disk with all its sector marks and other overhead already written on it. It's less than unformatted capacity, which is that of a blank disk which can't be used until it is formatted.

Some portable computers provide the capability to incorporate a hard disk. As you read this, Kaypro will be shipping sample copies of its new Kaypro 10 computer, with a 10-Mb Winchester disk, to its dealers. The software bundled with the computer will reside on the hard disk. This will provide a lot more storage than the floppy drives, with an additional $1000 added to the price tag. If you need the storage, it's a good idea to look at a portable that has a built-in hard disk.

The need for backup

If you've decided to go for a portable computer with an internal hard disk, remember the need for data backup. It wouldn't make a lot of sense to have all that data on your hard disk, and then have the baggage handlers for Fly-by-Night airlines lose your computer and data for, say, a week or so, by accidentally sending it to Afghanistan. Most portable computers will slip under an airplane seat, but then what do you do with your feet? You might want to ship the computer in the baggage compartment anyway. In any case, backup is extremely important in the case of a hard disk that's permanently located in a machine you will be carrying around. So if you're interested in such a computer, make sure you get a floppy drive in the package, too, and then make sure you carry the floppies you use for backup in a separate piece of luggage when you're traveling.

The two-drive system

While backup isn't quite as critical in the case of a floppy-drive-based machine, it's still a good idea to get two drives, instead of opting for one double-density type. You'll almost certainly want to make copies of your data from time to time, either for backup or for distribution to others. Two drives remove the drudgery of making copies with one drive. Again, you should have backup disks for traveling, and you can carry the backup copies in your carry-on luggage if you check your computer through. You can always buy a new computer—you pay hard cash for it. But you pay with time if you have to reconstruct your data files.

Every computer has to communicate with external devices if it is to be of any use. This means it must have I/O ports that get information into and out of the machine. Almost all portable computers come with a variety of I/O ports. The most common are serial ports for connecting devices like serial printers and modems, and Centronics-compatible (Centronics is a printer manufacturer whose printer interface has been accepted as a de facto industry standard) parallel ports. There are other possibilities. Osborne has an IEEE-488 parallel port instead of a Centronics port. Not to worry, though. The company has put some patches in the CP/M operating system that comes bundled with the computer, to allow ordinary parallel printers to run on the 488 port.

There's really not much to say about the ports on these computers, except that more is better. If a machine has two RS-232-C serial ports, you can connect two serial devices at a time instead of one. That will allow you to use a serial printer and a modem without disconnecting and reconnecting. If you'd like to have an external monitor to supplement the smaller built-in one, make sure the computer provides an external video connection so you can hook up the monitor.

More expandability

There's one computer, the Star Lite, that provides more expandability than most because, in addition to the normal complement of ports, it uses the S-100 bus and leaves four slots open on the bus. Bus-oriented computers are inherently more versatile than are single-board computers, because of the variety of attachments with which you can customize them. They're also more expensive. In this particular case, there are literally hundreds of S-100 boards you can plug into the Star Lite which comes from Compushop in Cambridge, Mass. George Davis, Compushop's general manager, says this computer isn't for the average user, but if you have a need for a customizable portable—maybe one that can easily do A/D conversion for field scientific work, say, this could be it.

There's another class of portables that's smaller than those we've been discussing. This class is typified by the Hewlett-Packard 75. Hewlett-Packard calls its 75 portable, but tries to distinguish it from under-the-airplane-seat portables by calling those larger machines "transportable computers." Jack Peters, a product manager for HP in Corvallis, Ore. says the 75 is designed for people who need to run a BASIC-programmable computer in places that don't have AC power. The 75, and a few other portable computers, have built-in batteries that obviate the need for a wall plug, and also have low-power CMOS (complementary metal-oxide semiconductor) memory which retains its information while using very little power. The batteries will keep the memory going for a long time. You can even change batteries without losing the data—provided, of course, that you're very quick.

These small portables don't deliver full-size displays, but they do allow you to scroll your information. You can think of the display you have as a "window" on the full display. An 80 by 4 display, for example, like the one on the Athena, lets you scroll up and down to see the other lines of your data. The HP 75, the TI Compact Computer 40, and the Epson HX-20 provide up and down and side-to-side scrolling which allows you to see not only more lines, but wider lines than can be crammed into the small display.

The hand-helds

A step down from the portable computers (which fit into a briefcase) are the hand-held computers. These are the very tiniest of computers. They come with small amounts of RAM and ROM, and are suitable for only a few applications. Their chief utility is their ability to handle remote data collection. You can see this by comparing their specifications with those of the larger computers in the buyer's guide chart (page102).The very small computers have much less memory than their larger cousins, and there is often no packaged software for them. This means you have to program them in BASIC, or FORTH for the Epson, for particular applications, in much the same way people used to have to write programs for Apples and TRS-80s. This should change as the hand-held computers gain popularity. Radio Shack, for example, just released a number of programs for its PC-2 pocket computer. HP provides ROM-based software for its HP 41C hand-held computer in small plastic packages. You use these software modules as you would a video-game cartridge: Turn the computer on with the appropriate package plugged in, and your computer is ready to go.

Hand-held computers are handy little devices because they are so easy to carry around. The Radio Shack Pocket Computer really does fit into a shirt pocket. It's programmable in BASIC, can be connected to a four-color printer/plotter which uses four small pens to draw characters when you're printing, and has a one-line alphanumeric display. Some hand-held computers, like the Panasonic Link, can be bought already fitted into a briefcase containing the computer and its peripherals—a modem, printer, storage, and the like.

They're handy because they usually interface readily with peripherals and even larger computers from the same manufacturer. If they have a modem, of course, you can use them to talk to your stationary computer back at the office. But they can do more than that. Often they have provision for using a TV set or a dedicated video monitor to show you a full display. Some, like the HP 41C, use special interface capabilities to drive a whole list of peripherals which also run with the larger computers, like printers and plotters.

What about price?

If you're in the market for a computer at all, it makes sense to consider a portable—if for no other reason than price. A portable computer with its bundled software is a good deal. If you take a full-blown, desk-top computer for example, with monitor, printer, disk drives, modem, and a couple of other options, it will retail for about $3000—without the software. That's an estimate, of course. Prices vary greatly. An Osborne 1 and a Kaypro II go for $1795, and they have software included for common professional applications. They also include two disk drives, so all you need to add to equal that desk-top are

If you're in the market for a computer, it makes sense to consider a portable.

a modem and a printer. Figure on spending about $3000 for the total package. Of course, you sacrifice the larger monitor to get that, and you may also have to compromise on the software.

Some choices

Here's what all that means. If you like WordStar, then the fact that this program comes bundled with the Osborne 1 is a great feature for you. WordStar is a standard, of sorts, which means a lot of people in the world use it. You're likely to be able to find people who can help you with it if you run into a problem. But suppose you're one of those people who, having tried this word processor, just don't like the way it works. Then you have to make a decision that could affect the computer system choice as well as the software choice.

In fact, this could swing you away from the Osborne 1 to one of the computers which runs the Perfect series of software. If that's the case, then you may be giving up the support you could get from a particular Osborne dealer you really like, or you might not get some other feature available on the Osborne that you're especially fond of. We're not picking on the Osborne computer here. The same thing goes for any of the portables that offer bundled software.

David Kay, vice president of the Kaypro division of Non-Linear Systems, points out that software bundling relieves the computer buyer of making the software choice, and he suggests that the total system is important. That's true, but it flies in the face of conventional wisdom in buying a computer, which says that the application determines the software, and the software required for the application determines the hardware needed to run that software. In the case of portables with bundled software, the system manufacturers have decided which applications are most

(continued on page 165)
(chart begins on the next page)

PORTABLE AND HAND-HELD COMPUTERS BUYER'S GUIDE

ACCESS MATRIX CORP.
2159 Bering Dr.
San Jose, CA 95131
(408) 263-3660
CIRCLE 250

ADCOCK & JOHNSON
P.O. Drawer 8778
Fort Worth, TX 76112
(817) 429-5131
CIRCLE 251

ATHENA COMPUTER & ELECTRONICS SYSTEMS
31952 Camino Capistrano
San Juan Capistrano, CA 92675
(714) 661-2276
CIRCLE 272

CASIO INC.
15 Gardner Rd.
Fairfield, NJ 07006
(201) 575-7400
CIRCLE 252

COMMODORE BUSINESS MACHINES
487 Devon Park Dr.
Wayne, PA 19087
(215) 687-9750
CIRCLE 253

COMPAQ COMPUTER CORP.
12330 Perry Rd.
Houston, TX 77070
(800) 231-9966
CIRCLE 254

COMPUTER DEVICES
25 North Ave.
Burlington, MA 01803
(800) DOT WORD
CIRCLE 255

COMPUTERSHOP
139 First St.
Cambridge, MA 01241
(617) 661-2670
CIRCLE 256

COMPUTER SYSTEMS
26401 Harper Ave.
St. Clair Shores, MI 48081
(313) 779-8700
CIRCLE 273

CORONA DATA SYSTEMS INC.
31324 Via Colinas, Suite 110
Westlake Village, CA 91361
(213) 707-0672
CIRCLE 274

DIGITAL MICROSYSTEMS
1755 Embarcadero
Oakland, CA 94606
(415) 532-3686
CIRCLE 275

DYNALOGIC INFO-TECH CORP.
81 Colonnade Rd.
Ottawa, Ont., Canada
K2E 7M6
(613) 226-1383
CIRCLE 276

EPSON AMERICA INC.
3215 Kashiwa St.
Torrance, CA 90505
(213) 539-9140
CIRCLE 257

GRID SYSTEMS
2535 Garcia Ave.
Mountain View, CA 94043
(415) 961-4800
CIRCLE 258

HEWLETT-PACKARD
1000 Circle Blvd. NE
Corvallis, OR 97330
(800) 547-3400
CIRCLE 259

JONOS LIMITED
920C E. Orangethorpe
Anaheim, CA 92801
(714) 871-1082
CIRCLE 277

MICRO SOURCE INC.
P.O. Box 319
New Lebanon, OH 45345
(513) 687-1374
CIRCLE 278

NON-LINEAR SYSTEMS
533 Stevens Ave.
Solana Beach, CA 92075
(619) 755-1134
CIRCLE 260

OSBORNE COMPUTER CORP.
26500 Corporate Ave.
Hayward, CA 94545
(800) 227-1617
CIRCLE 261

OTRONA ADVANCED SYSTEMS
4755 Walnut
Boulder, CO 80301
(303) 444-8100
CIRCLE 262

PANASONIC COMPANY
One Panasonic Way
Secaucus, NJ 07094
(201) 348-7182
CIRCLE 263

PERIPHERAL SYSTEMS INC.
100 Lincoln Dr. E.
Marlton, NJ 08053
(609) 983-7300
CIRCLE 279

PERSONAL MICRO COMPUTERS INC.
475 Ellis St.
Mountain View, CA 94043
(415) 962-0220
CIRCLE 280

QUASAR CO.
9401 W. Grand Ave.
Franklin Park, IL 60131
(312) 451-1200
CIRCLE 281

RADIO SHACK-TANDY CORP.
One Tandy Center
Fort Worth, TX 76102
(817) 390-3011
CIRCLE 264

SEEQUA COMPUTER CORP.
209 West St.
Annapolis, MD 21401
(301) 268-6650
CIRCLE 265

SHARP ELECTRONICS CORP.
10 Sharp Plaza
Paramus, NJ 07662
(201) 265-5600
CIRCLE 266

STM ELECTRONICS CORP.
525 Middlefield Rd.
Menlo Park, CA 94025
(415) 326-6226
CIRCLE 267

TELCON INDUSTRIES INC.
1401 NW 69th St.
Fort Lauderdale, FL 33309
(305) 971-2250
CIRCLE 268

TELERAM COMMUNICATIONS CORP.
2 Corporate Park Dr.
White Plains, NY 10604
(914) 694-9270
CIRCLE 269

TEXAS INSTRUMENTS
23-01 N. University
Lubbock, TX 79415
(214) 995-2011
CIRCLE 270

TIMEX COMPUTER CORP.
P.O. Box 2655
Waterbury, CT 06725
(203) 573-5000
CIRCLE 271

Portable And Hand-Held Computers

COMPANY/ PRODUCT	IBM-COMPATIBLE?	SIZE (CLOSED)	HAND-HELD (H) OR PORTABLE (P)	WEIGHT	DISPLAY SIZE (COLUMNS X LINES)	DISPLAY SCROLL (U,D,R,L)	DISPLAY TYPE	MEMORY SIZE (MIN., MAX.)	NO. AND TYPE DISK DRIVES (H-HARD; F-FLOPPY)
ACCESS MATRIX CORP. Access	N	16 1/8″ × 10 13/16″ × 10″	P	33 lb.	80 × 24 (25th-status line)	U,D,R,L	CRT	64k	2 5 1/4″ (F)
ADCOCK & JOHNSON Model 3000 (Model III in a Briefcase)	N	19.5″ × 14.8″ × 8.5″	P	28 lbs.	64 × 16 (80×24 option)	U,D,R,L	CRT	48k-64k	2 5 1/4″ (F) single-sided, double-density
ATHENA COMPUTER	N	14 1/2″ × 11 7/8″ × 3 3/8″	P	16 lb.	80×4	U,D	LCD	64k	1 5 1/4″ (F)-single-sided, double-density; 512k internal solid-state storage
CASIO INC. Model FX 700 P	N	6 1/2″ × 2 3/8″ × 3/8″	H	4.2 oz.	N/A	R,L	LCD	2k	N/A
Model FX 802 P (with built-in printer)	N	6 7/8″ × 3 1/2″ × 3/4″	H	9.1 oz.	N/A	R,L	LCD	2k	N/A
COMMODORE BUSINESS MACHINES Executive 64 (available fall 1983)	N	24″ × 18″ × 9″	P	under 20 lb.	40 × 25	U,D,R,L	CRT	64k	1 or 2 built-in 5 1/4″ (F), or external drives (H)
COMPAQ COMPUTER CORP. Compaq Portable Computer	Y	20″ × 16″ × 8 1/2″	P	28 lb.	80 × 25	U,D	CRT	128k-512k	2 5 1/4″ (F)
COMPUTER DEVICES DOT	N	15″ × 15″ × 7.5″	P	28-30 lb.	80 or 132 × 16 or 25	U,D	CRT	64k-704k (above 256k, need another card)	2 3 1/2″ SONY micro floppies
COMPUTER SHOP Star-Lite	N	16″ × 16″ × 7 1/2″	P	34 lb.	80 × 24	U,D,L,R and slow scroll mode	CRT	64k	2 5 1/4″ (F), single-sided double-density (400k-expandable to hard disk)
COMPUTER SYSTEMS PC/8088	Y	19″ × 16 1/2″ × 7 1/2″	P	25-30 lb.	80 × 25	U,D	CRT	16k-512k	1 or 2 5 1/4″ (F)
CORONA DATA SYSTEMS Corona Portable PC	Y	20″ × 20″ × 8″	P	30 lb.	80×25	U,D,R,L	CRT	128k-512k	1 or 2 5 1/4″ (F) (320 kbytes each)
DIGITAL MICROSYSTEMS DMS 3F (The Fox)	N	17.5″ × 14.7″ × 7.8″	P	30 lb.	80×25	U,D	CRT	64k	2 5 1/4″ (F)-double-sided, double-density
DMS 15	N	17.5″ × 14.7″ × 7.8″	P	36 lb.	80 × 25	U,D	CRT	64k	1 5 1/4″ (F)-double-sided, double-density 15M Winchester hard disk

Most portable computers include a keyboard, display, disk drives, and software.

COMMUNICATIONS CAPABILITY? (IF YES, WHAT TYPE?)	NO. AND TYPE OF PORTS	EXTERNAL MONITOR, PRICE	FULL-SIZE KEYBOARD	OTHER PERIPHERALS, PRICES	OPERATING SYSTEM	BUNDLED SOFTWARE (SPECIFY)	PRICE
Y—built-in acoustic coupler and direct-connect modem	1 parallel and bi-directional-Centronics compatible; IEEE 488; 2 RS-232C; composite video output jack; 8" disk drive interface	7" amber (integral)	Y	Built-in dot-matrix printer	CP/M 2.2	Perfect Writer; Perfect Calc; Perfect Speller; Perfect Filer; MBASIC; CBASIC; communications support; system utilities; Fancy Font	$2495
Y—RS-232 or 300 baud modem (optional)	1 Centronics parallel; RS-232; optional external drive; data bus; cassette port	built-in 9" green, non-glare screen	Y		TRS-DOS		$2895 ($795-kit, converts Model III to portable)
Y—serial ports	2 RS-232 C; 1 parallel printer port	N/A	Y		CP/M 2.2	JRT; Pascal; Profitplan; mini Vedit	$3950
N	N/A	N/A	N	FA-3 cassette interface—$39.95; FP-12 printer—$69.95	C-82 Casio BASIC	Fin. Analysis; Coupon Clipper; aviation, math, and engineering, program library for math, science, finance, others	$99.95
N	N/A	N/A	N	FA-3 cassette interface—$39.95	C-82 Casio BASIC	same	$149.95
Y—modem	Expansion/cartridge port; IEEE 488; user RS-232 port; serial; external audio-video port	built-in	Y	Printer—under $400; VICMODEM—$100 AUTOMODEM—under $200	6510; optional Z80 for CP/M	word processor; spreadsheet	from $995 to $1495 (depends on configuration)
Y—asynchronous interface	4-parallel printer; GB color monitor; composite video monitor; color or b&w TV modulator; RS-232 port	built-in	Y	IBM-compatible peripherals	MS-DOS	BASIC	$2995 (128k and 1 floppy disk)
Y-300/1200 baud modem	2 RS-232 ports; RJ 11 phone jack	separate video output jack	Y	160 cps printer (integral)	MS-DOS;CP/M 2.2; Z80 option	3270, 3280 emulation; Multiplan; Word Processor; Time Manager; Data Base	$2995-base $4500-128k, 2 drives, printer
Y—RS-232 to connect to modem, optional RS-232 port	1 serial RS-232; Centronics	N/A	Y, with 24 program-mable function keys	IEEE S-100 boards	CP/M	Perfect Writer; Perfect Calc; modem program	$2695
Y—RS-232 or 422	1 or more RS-232 or 422; IEEE	$190-mono-chrome, $500 up-color	Y	Hard disk option—from $2500; parallel and analog I/O options—from $200; memory boards—from $290; Z80 processor—$500 (with memory); color graphics monitor—$900	MS-DOS or CP/M	BASIC; skeleton executive	$3488
Y—built-in serial port	1 serial; 1 built-in parallel port	built-in 9" green screen	Y	Hard disk (10M)—$2695	MS-DOS;CP/M-86	Multi Mate word processor	$2395
Y-modem	3 RS-232 serial; 1 RS-422 serial network port		Y		CP/M		$3995
Y—modem	same		Y		CP/M		$7495

(continued)

PORTABLE AND HAND-HELD COMPUTERS

COMPANY/ PRODUCT	IBM-COMPATIBLE?	SIZE (CLOSED)	HAND-HELD (H) OR PORTABLE (P)	WEIGHT	DISPLAY SIZE (COLUMNS X LINES)	DISPLAY SCROLL (U,D,R,L)	DISPLAY TYPE	MEMORY SIZE (MIN., MAX.)	NO. AND TYPE DISK DRIVES (H-HARD; F-FLOPPY)
DYNALOGIC INFO-TECH Hyperion	Y	8.3"×11.3"×8.6"	P	21 lb.	80 × 25	U,D,R,L	CRT	256k RAM; 8k ROM	2 5^1/4" (F)-double-sided, double-density
EPSON AMERICA INC. HX-20	N	11.375"×8.5"×1.75"	P	3 lb. 13 oz.	20 × 4	U,D,R,L	LCD	16k-32k (with expansion unit); 32k ROM-40k (expandable internally, and to 64k with expansion unit)	
GRID SYSTEMS The Compass Computer	Y	15"×11"×2"	P	10 lb.	53 × 24	U,D,R,L	electraluminescent	256k RAM; 384k non-volatile bubble	
HEWLETT-PACKARD HP-41C (CV)	N	5.6"×3.1"×1.3"	H	7.2 oz.	12 alpha characters or 10 digits	R,L	LCD	1k-6k 2k-6k (CV)	N/A
HP-75	N	10"×5"×1^1/4"	P	26 oz.	32 × 1	U,D,R,L	LCD	64k-160k	
JONOS LIMITED 2100	N	17^1/4"×13^1/4"×7^1/4"	P	25 lb.	80 × 25	U,D	CRT	64k-128k	2 3^1/2" SONY micro floppies; third optional internal drive
MICRO SOURCE M600P-Voyager	N	20"×17"×7"	P	35 lb.	80 × 24	U,D	CRT	64k	2 5^1/4" (F)-double-sided, double-density
NON-LINEAR SYSTEMS KayPro II	N	18"×15^1/2"×8"	P	26 lb.	80 × 25		CRT	64k	2 5^1/4" (F)
OSBORNE COMPUTER CORP. The Executive	Y	20.5"×13"×9"	P	28 lb.	80 × 24 (80×25 option with coprocessor)	U,D	CRT	128k (256k with coprocessor)	2 5^1/4" single-sided, double-density drives (H)
Osborne I	N	20.5"×14.5"×8.5"	P	26.7 lb.	52 × 24	U,D,R,L	CRT	64k	2 5^1/4" (F) single-sided, single density
OTRONA ADVANCED SYSTEMS The Attaché	N	13.6"×12"×5.75"	P	18 lb.	80 × 24	U,D	CRT	64k	2 5^1/4" double-sided double-density (F)
PANASONIC The Link-Model RL-H 1400 (Model RL-H 1800)	N	8^5/16"×3^3/4"×1^3/16"	P&H	14 oz.	159 × 8 dot, 26 character	N/A	LCD	4k (8k)	N/A
PERIPHERAL SYSTEMS Eagle	N	18"×17"×8"	P	18 lb.	80 × 24	U,D	CRT	64k-156k (CMOS battery backup)	2 SONY micro floppies

Portable computers offer the combined virtues of complete portability and low cost.

COMMUNICATIONS CAPABILITY? (IF YES, WHAT TYPE?)	NO. AND TYPE OF PORTS	EXTERNAL MONITOR, PRICE	FULL-SIZE KEYBOARD	OTHER PERIPHERALS, PRICES	OPERATING SYSTEM	BUNDLED SOFTWARE (SPECIFY)	PRICE
Y—300 baud internal modem	1 serial; 1 parallel	use with all monitors	Y	Other programming languages available	MS-DOS	Microsoft advanced disk BASIC; MultiPlan;Executive Text Editor; electronic mail terminal; telephone management system	$4995
Y—RS-232C plus serial port	2 communications ports; bar code reader; cassette, system bus; ROM cartridge; microcassette interface	built-in	Y	ZX-20-AA acoustic coupler—$165	Microsoft BASIC		$795
Y—built-in 212A and 103 modems	IEEE 488; RS-232; RS-422		N	Floppy/hard disk combination—$4100; dot-matrix printer—$850; telephone hand set—$60	PCOS	GRIDPLOT;GRIDPLAN; GRIDFILE;GRIDWRITE; GRIDTERM—$900 (optional)	$8150
N	4-HPIL interface loop (module)	$295	N	Plug-in card reader—$195; Printer/Plotter—$385; Optical Wand—$125	reverse Polish notation (RPN)		$195 ($275-CV)
Y—HPIL interface loop; modems	1—for interface loop	$295	N	Printers—from $450; plotters—from $1550; digital cassette drive—from $450	HP-BASIC	Editing; personal finance; file manager; games	$995
Y—optional, with a modem	2 RS-232 serial; optional Centronics parallel port	built-in 9" green, non-glare screen	Y	Attachable printer-$695; STD bus card options (8 slot STD bus card cage with 5 open slots standard in unit); battery pack option; leather case option	CP/M	CP/M; MBASIC 80; Multiplan;Spellbinder;' Spellcheck	$3995
Y—serial; port	1 RS-232 serial; 1 parallel printer port	N/A	Y	Hard drive—$2495; 300 baud acoustic coupler—$350; external 8" disk drive—$949	CP/M 2.2	Utilities; Archivist; word processor; data base manager spreadsheet; compiler; FORTH; others	$3900
Y—RS-232C interface	1 RS-232C; 1 parallel	9" diagonal	Y		CP/M 2.2	Perfect Writer; Perfect Speller; Perfect Calc; Perfect Filer	$1795
Y	2 serial ports (asynchronous and RS-232C); IEEE port	7" diagonal	Y	Bell 103 auto-dial, auto-answer modem—$265 (includes software)	CP/M + or UCSDP	WordStar; MailMerge; SuperCalc; CBASIC; MBASIC; Executive Data Manager	$2495 (Z80 version) from $3095 (coprocessor version)
Y—modem port	1 serial; 1 IEEE; ext. video battery port	5" diagonal	Y	modem	CP/M		$1795 $1995 with 2 single-sided, double-density disks
Y—modem	1 RS-232C; party line connection to other computers; 2 identical full-function ports	5" diagonal, built-in	Y		CP/M	WordStar Plus; BASIC; VALET; CHARTON	$3995
Y—telephone modem	I/O adaptor; RS-232 interface; TV adaptor	use with TV	Y	Asynchronous modem—$250; TV adaptor (color/graphics)—$349; 40-character printer—$300; 8k or 16k RAM expansion packs—$250, $350; modem with cassette interface—$300; X-Y 4-color plotter—$480	SnapFORTH		$380 ($480)
Y—serial ports	2 serial; 1 parallel	$300	Y	300 baud modem—$250; memory expansion to 256k—$1000	CP/M or TASK	spreadsheet; word-processing; speller; inventory	$3495

(continued)

PORTABLE AND HAND-HELD COMPUTERS

COMPANY/ PRODUCT	IBM-COMPATIBLE?	SIZE (CLOSED)	HAND-HELD(H) OR PORTABLE(P)	WEIGHT	DISPLAY SIZE	DISPLAY SCROLL (U,D,R,L)	DISPLAY TYPE	MEMORY SIZE (MIN., MAX.)	NO. AND TYPE DISK DRIVES (H-HARD; F-FLOPPY)
PERSONAL MICRO COMPUTERS PMC MicroMate	N	13"×6"×3 1/2"	P	8 lb.	80 × 24	U,D	CRT	128k RAM; 4k ROM	Can operate with any combination of 4 5 1/4" (F), single/double-sided, single/double-density disk drives
QUASAR CO. HHC HK 2500 (2k) HHC HK 2600 (4k) HHC HK 2608 (8k)	Y	9"×3 3/4"×1 1/4"	H	1 lb. 4oz.	26 characters	U,D	LCD	2k,4k,8k	N/A
RADIO SHACK PC1	N	6 7/8"×2 3/4"×11/16"	H	6 oz.	24 characters	U,D,R,L	LCD	1.9k	N/A
PC2	N	7 11/16"×3 3/8"×1 1/16"	H	16 oz.	26 characters	U,D,R,L	LCD	2.6k-10.6k	N/A
TRS-80 Model 100	N	11 7/8"×8 1/2"×2"	P	4 lb.	40 × 8	U,D	LCD	8k-32k	
SEEQUA COMPUTER CORP. The Chameleon	Y	18"×16"×8"	P	28 lb.	80 × 25	U,D	CRT	128k-256k plus expansion box	2 5 1/4" single-sided, double-deisity (F); hard disk through expansion box
SHARP ELECTRONICS CORP. PC 1250	N	5 5/16"×2 3/4"×3/8"	H	115 grams	7 × 24	N/A	LCD	2.2k	N/A
PC 1500	N	7 11/16"×3 3/8"×1	H	375 grams	7 × 24	N/A	LCD	2.2k-8k	N/A
STM ELECTRONICS CORP. Pied Piper	N	20"×11"×4"	P	12.5 lb.	80 × 24 (or 40 × 24)	U,D (U,D,R,L)	option-al LCD, 80 col. × 2 lines	64k	1 built-in disk drive—784k formatted with I/O and power as standard in second drive (10M-H or 1 M-F)
TELCON INDUSTRIES INC. Zorba	Y	17 1/2"×16"×9"	P	22 lb.	80×25 (7" screen)	U,D,R,L	CRT	64k	2 (F), double-density, double-sided
Nomis 9	Y	17 1/2"×16"×9"	P	23 lb.	80×25 (9" screen)	U,D,R,L	CRT	64k-upgradable	same
TELERAM COMMUN. CORP. Teleram 3000 Model I (II)	N	13"×9.75"×3.45"	P	8 lb. 13 oz.	80×4	U,D	LCD	64k	internal bubble memory modules—128k bytes (256k bytes)
TEXAS INSTRUMENTS Compact Computer 40	N	9 1/2"×5 3/4"×1"	H	22 oz.	31 characters	U,D,R,L	LCD	6k ROM 34k ROM	
TIMEX COMPUTER CORP. Timex Sinclair 1000	N	6 7/8"×6 3/8"×1 3/8"	P	12 oz.	32×24	U,D	CRT	2k-16k (with accessories)	

PORTABLE AND HAND-HELD COMPUTERS

COMPANY/ PRODUCT	IBM-COMPATIBLE?	SIZE (CLOSED)	HAND-HELD(H) OR PORTABLE(P)	WEIGHT	DISPLAY SIZE	DISPLAY SCROLL (U,D,R,L)	DISPLAY TYPE	MEMORY SIZE (MIN., MAX.)	NO. AND TYPE DISK DRIVES (H-HARD; F-FLOPPY)
PERSONAL MICRO COMPUTERS PMC MicroMate	N	13″×6″×3 1/2″	P	8 lb.	80 × 24	U,D	CRT	128k RAM; 4k ROM	Can operate with any combination of 4 5 1/4″ (F), single/double-sided, single/double-density disk drives
QUASAR CO. HHC HK 2500 (2k) HHC HK 2600 (4k) HHC HK 2608 (8k)	Y	9″×3 3/4″×1 1/4″	H	1 lb. 4oz.	26 characters	U,D	LCD	2k,4k,8k	N/A
RADIO SHACK PC1	N	6 7/8″×2 3/4″×11/16″	H	6 oz.	24 characters	U,D,R,L	LCD	1.9k	N/A
PC2	N	7 11/16″×3 3/8″×1 1/16″	H	16 oz.	26 characters	U,D,R,L	LCD	2.6k-10.6k	N/A
TRS-80 Model 100	N	11 7/8″×8 1/2″×2″	P	4 lb.	40 × 8	U,D	LCD	8k-32k	
SEEQUA COMPUTER CORP. The Chameleon	Y	18″×16″×8″	P	28 lb.	80 × 25	U,D	CRT	128k-256k plus expansion box	2 5 1/4″ single-sided, double-deisity (F); hard disk through expansion box
SHARP ELECTRONICS CORP. PC 1250	N	5 5/16″×2 3/4″×3/8″	H	115 grams	7 × 24	N/A	LCD	2.2k	N/A
PC 1500	N	7 11/16″×3 3/8″×1	H	375 grams	7 × 24	N/A	LCD	2.2k-8k	N/A
STM ELECTRONICS CORP. Pied Piper	N	20″×11″×4″	P	12.5 lb.	80 × 24 (or 40 × 24)	U,D (U,D,R,L)	option-al LCD, 80 col. × 2 lines	64k	1 built-in disk drive—784k formatted with I/O and power as standard in second drive (10M-H or 1 M-F)
TELCON INDUSTRIES INC. Zorba	Y	17 1/2″×16″×9″	P	22 lb.	80×25 (7″ screen)	U,D,R,L	CRT	64k	2 (F), double-density, double-sided
Nomis 9	Y	17 1/2″×16″×9″	P	23 lb.	80×25 (9″ screen)	U,D,R,L	CRT	64k-upgradable	same
TELERAM COMMUN. CORP. Teleram 3000 Model I (II)	N	13″×9.75″×3.45″	P	8 lb. 13 oz.	80×4	U,D	LCD	64k	internal bubble memory modules—128k bytes (256k bytes)
TEXAS INSTRUMENTS Compact Computer 40	N	9 1/2″×5 3/4″×1″	H	22 oz.	31 characters	U,D,R,L	LCD	6k ROM 34k ROM	
TIMEX COMPUTER CORP Timex Sinclair 1000	N	6 7/8″×6 3/8″×1 3/8″	P	12 oz.	32×24	U,D	CRT	2k-16k (with accessories)	

Portable computers offer the combined virtues of complete portability and low cost.

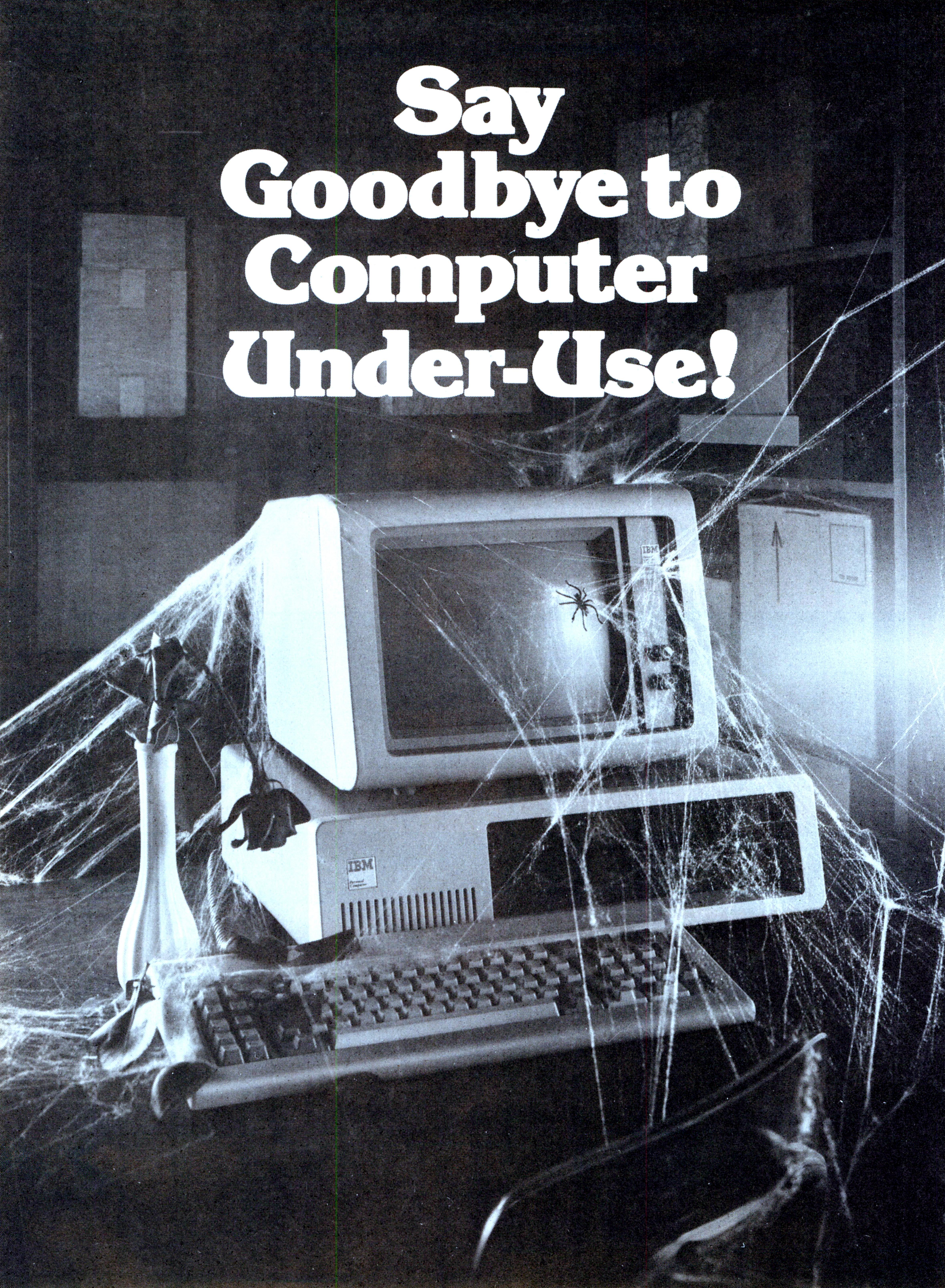
COMMUNICATIONS CAPABILITY? (IF YES, WHAT TYPE?)	NO. AND TYPE OF PORTS	EXTERNAL MONITOR, PRICE	FULL-SIZE KEYBOARD	OTHER PERIPHERALS, PRICES	OPERATING SYSTEM	BUNDLED SOFTWARE (SPECIFY)	PRICE
Y—300 baud internal modem	1 serial; 1 parallel	use with all monitors	Y	Other programming languages available	MS-DOS	Microsoft advanced disk BASIC; MultiPlan;Executive Text Editor; electronic mail terminal; telephone management system	$4995
Y—RS-232C plus serial port	2 communications ports; bar code reader; cassette, system bus; ROM cartridge; microcassette interface	built-in	Y	ZX-20-AA acoustic coupler—$165	Microsoft BASIC		$795
Y—built-in 212A and 103 modems	IEEE 488; RS-232; RS-422		N	Floppy/hard disk combination—$4100; dot-matrix printer—$850; telephone hand set—$60	PCOS	GRIDPLOT;GRIDPLAN; GRIDFILE;GRIDWRITE; GRIDTERM—$900 (optional)	$8150
N	4-HPIL interface loop (module)	$295	N	Plug-in card reader—$195; Printer/Plotter—$385; Optical Wand—$125	reverse Polish notation (RPN)		$195 ($275-CV)
Y—HPIL interface loop; modems	1—for interface loop	$295	N	Printers—from $450; plotters—from $1550; digital cassette drive—from $450	HP-BASIC	Editing; personal finance; file manager; games	$995
Y—optional, with a modem	2 RS-232 serial; optional Centronics parallel port	built-in 9" green, non-glare screen	Y	Attachable printer-$695; STD bus card options (8 slot STD bus card cage with 5 open slots standard in unit); battery pack option; leather case option	CP/M	CP/M; MBASIC 80; Multiplan;Spellbinder;' Spellcheck	$3995
Y—serial; port	1 RS-232 serial; 1 parallel printer port	N/A	Y	Hard drive—$2495; 300 baud acoustic coupler—$350; external 8" disk drive—$949	CP/M 2.2	Utilities; Archivist; word processor; data base manager; spreadsheet; compiler; FORTH; others	$3900
Y—RS-232C interface	1 RS-232C; 1 parallel	9" diagonal	Y		CP/M 2.2	Perfect Writer; Perfect Speller; Perfect Calc; Perfect Filer	$1795
Y	2 serial ports (asynchronous and RS-232C); IEEE port	7" diagonal	Y	Bell 103 auto-dial, auto-answer modem—$265 (includes software)	CP/M + or UCSDP	WordStar; MailMerge; SuperCalc; CBASIC; MBASIC; Executive Data Manager	$2495 (Z80 version) from $3095 (coprocessor version)
Y—modem port	1 serial; 1 IEEE; ext. video battery port	5" diagonal	Y	modem	CP/M		$1795 $1995 with 2 single-sided, double-density disks
Y—modem	1 RS-232C; party line connection to other computers; 2 identical full-function ports	5" diagonal, built-in	Y		CP/M	WordStar Plus; BASIC; VALET; CHARTON	$3995
Y—telephone modem	I/O adaptor; RS-232 interface; TV adaptor	use with TV	Y	Asynchronous modem—$250; TV adaptor (color/graphics)—$349; 40-character printer—$300; 8k or 16k RAM expansion packs—$250, $350; modem with cassette interface—$300; X-Y 4-color plotter—$480	SnapFORTH		$380 ($480)
Y—serial ports	2 serial; 1 parallel	$300	Y	300 baud modem—$250; memory expansion to 256k—$1000	CP/M or TASK	spreadsheet; word-processing; speller; inventory	$3495

(continued)

Generally, portable computers provide more computing power than the hand-held variety.

COMMUNICATIONS CAPABILITY? (IF YES, WHAT TYPE?)	NO. AND TYPE OF PORTS	EXTERNAL MONITOR, PRICE	FULL-SIZE KEYBOARD	OTHER PERIPHERALS, PRICES	OPERATING SYSTEM	BUNDLED SOFTWARE (SPECIFY)	PRICE
Y—RS-232C	2 serial asynchronous ports; 4 high-speed, bidirectional, parallel ports; 1 Centronics-compatible parallel printer port; connector for additional disk drives		can be used with any terminal	Operates with any external peripherals that use either an asynchronous serial (RS-232C) or 8-bit parallel interface, Centronics interface	CP/M+; compatible with CP/M 2.2	T/Maker III—includes spreadsheet, word processing and text editing, list processing, file management, data transfer	$1495 (incl. terminal) $995 (without terminal)
Y—acoustic coupler/modem	1 serial port; I/O adaptor for interfacing up to six peripherals	TV adaptor-$295	N	I/O adaptor—$150; RS-232C interface—$250; microprinter—$225; miniprinter—$295; four-color plotter/printer—$475; acoustic coupler/modem—$250; cassette interface/modem—$295; TV adaptor—$295; programmable memory, 4k—$150. 8k—$250, 16k—$350; attaché case—$170	SnapFORTH; SnapBASIC; Microsoft BASIC; Portaflex	available at additional cost	$329 (2k) $379 (4k) $479 (8k)
N	N/A	N/A	N	Cassette interface—$29.95; Printer interface—$127.95	BASIC		$149.95
Y—RS-232 interface	N/A	N/A	N	Printer cassette interface—$219.95 (4-color graphics)	BASIC		$199.95
Y—built-in 300 baud modem plus telecommunications software	1 RS-232 serial; 1 parallel port; telephone jack		Y	to be introduced	Microsoft BASIC	Text editor; scheduler; address handler; communications program	$799 (8k) $999 (24k) optional 8k RAM-$119.95 plus installation
Y—serial ports	1 serial; 1 parallel; IEEE 488; RGB; composite video; expansion port	use with all monitors	Y	Expansion chassis—$795	MS-DOS; CP/M-86; CP/M-80; CP/M+	MS-DOS; Perfect Writer; Perfect Calc; BASIC	$1995
N		N/A	N	Printer interface—$170	CPU		$110
Y—to RS-232 interface		N/A	N	Printer interface—$230	CPU	ROMware-$65	$220
Y—optional serial board with RS-232; modem	1 parallel port	use with all monitors	Y	2 serial boards—under $300; hard disks—under $2500; floppy disks—under $500; LCD display—under $400	CP/M	Perfect Writer; Perfect Calc; Perfect Speller; Perfect Filer; single drive disk and file copy; PV (40 column screen); Prepare	$1299
Y—RS-232	4-RS-232; IEEE 488; RS-232 serial or parallel PIA	$95	Y	cluster controller—$58.75 (8 channel); $69.95 (16 channel) for networking	CP/M 2.2	WordStar; CalcStar; MailMerge; CBASIC; M80; SourceCode	$1995 (incl. software)
same	same	same	Y	same	same	same	approx. $2400
Y—asynchronous	1 RS-232C; 1 parallel data bus for expansion	available 4/83	Y	Full screen monitor; floppy drives; additional interface ports—available 4/83	CP/M	CP/M-80; ASSIGN utility; DEFAULT utility; KEYDES utility; TeleTalk communications package	$2995 ($3595)
Y—modem available soon	HEX-bus	N/A	N	RS-232 interface (HX 3000)—$99.95; 4-color printer/plotter (HX 1000)— $199.95; digital tape drive (48k)—$139.95 (HX 2000)	TI operating system	22 application packages	$249.95
Y—modem to be introduced	1	TV-compatible	N	TS 2040 printer—$99.95; Timex Sinclair 1016 RAM module (16k)—$49.95	Sinclair BASIC		$99.95

(story continues on page 165)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CIRCLE 41

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Now, you can stock just one line of printers, yet meet a diversity of needs. Enjoy every advantage of single source supply. With each printer backed by General Electric's worldwide service.

Take a close look at any of the GE 3000 printers. You'll find they're easy to use, lightweight, functionally styled, reliable tabletop matrix printers. And when you take the entire GE 3000 series altogether, they stack up beautifully compared to everything else on the market today.

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GENERAL ELECTRIC

CIRCLE 42

Getting The Best From Data Banks

Data-base retrieval systems can be a valuable tool for any growing business

by Marvin Grosswirth

Among the myriad acronyms and initials plaguing the world of computers, DBRS may be somewhat less memorable than some. It may be easier to remember, however, if one thinks of it as DBR$.

The initials stand for "data-base retrieval system," a computerized service that's giving the competitive edge to thousands of executives, managers, entrepreneurs, and professionals by providing valuable information at low cost in a matter of minutes—information that would otherwise be available only through dogged, time-consuming, and expensive research if at all.

That information is contained in data bases, or data "banks," electronic libraries of millions of facts that can be selected, arrayed, arranged, saved, analyzed, and updated. Some of the information is so time-sensitive that many data bases are updated daily or even hourly. (DBRSs are sometimes called "on-line data bases" or "on-line data banks," but those terms are inaccurate, because many data bases are "on-line" only to authorized personnel of the organizations that own them.)

Law, medicine, corporate profiles, agribusiness, technical and professional journals in 40 languages, consumer buying habits, solar energy, financial management and planning, coal, oil, and forestry resources, commodities, pharmacology, aquatic sciences, alcoholism, Latin America, the Middle East, money markets, stock markets, supermarkets, and even the fertilizer market—these, and some 600 more fat files of "live" data are available. And all that is required to obtain the specific information is access to a personal computer or a terminal, a modem, communications software, and a telephone. Subscribers to DBRSs can "log on" to the services' mainframe computers and use the facilities of the big machines in a number of ways, not only in the handling of information, but, in some instances, for electronic mail and for computing power above and beyond the capabilities of their personal computers. Frequently, the DBRS's computer serves as a "front-end communicator," linking the subscriber's computer with the data-base owner's.

The data bases are usually independently owned—by an individual, a corporation, a news service, a government agency—and made available, over public or private communications carriers, by "vendors" who provide the DBRS. The vendor charges the user (known as a subscriber) a fee, and pays the data-base owner a royalty for each use.

This is no small-time business. Three of the best-known vendors are subsidiaries of large corporations who have years of experience in selling information. The Source is owned by The Reader's Digest Association, CompuServe is a subsidiary of H. & R. Block, and DIALOG is the property of Lockheed Corp. Boeing, General Electric, McGraw-Hill, Chase Manhattan Bank, Dow Jones, TRW, and Dun & Bradstreet are just a few of the major corporations sharing the profits to be gained by providing information services to other business operations, both great and small.

A better barrister

Chicago attorney Steve Bashaw has been practicing law for seven years, and has been a regular DBRS user for the last two years. He claims that using a DBRS has made him a better lawyer and has brought him more clients. Bashaw estimates that 85 to 90 percent of his practice is devoted to representing "mortgage houses—savings and loan associations, mortgage bankers, insurance companies that invest in mortgages . . . . Mortgage law, mortgage litigation—real estate mortgage foreclosures—are my specialty," he explains. "These are very heavily impacted by federal regulations.

"We do a newsletter for our clients

(continued on page 115)
(chart begins on the next page)

Marvin Grosswirth is a New York-based free-lance writer who specializes in computers.

A LISTING OF SOME ON-LINE DATA BASES

ACCOUNTANTS' INDEX
Provider: American Institute of Certified Public Accountants
On-line through: SDC Search Service
Subject: Information for accountants

ADTRACK
Provider: Corporate Intelligence, Inc.
On-line through: Dialog Info. Services, Inc.
Subject: Ads in print

AGRICOLA
Provider: U.S. Department of Agriculture
On-line through: BRS Inc.; Dialog Information Services, Inc.
Subject: Literature on agriculture

AGRICULTURE
Provider: Data Resources, Inc.
On-line through: Data Resources, Inc.
Subject: Agricultural economic data

AGRICULTURE FORECAST
Provider: Chase Econometrics/Interactive Data Corp.
On-line through: Chase Econometrics/Interactive Data Corp.
Subject: Agricultural economic data

AMERICAN PROFILES
Provider: Donnelley Marketing
On-line through: National CSS
Subject: 1980 Census demographic data

AUERBACH COMPAR
Provider: Auerbach, The Information Company
On-line through: BRS Inc.
Subject: Data-processing products

BALANCE OF PAYMENTS
Provider: International Monetary Fund
On-line through: Chase Econometrics/Interactive Data Corp.; Data Resources, Inc.; Rapidata, Inc.
Subject: International economic transactions

BILLBOARD INFORMATION NETWORK
Provider: Billboard Information network
On-line through: Billboard Information Network
Subject: Play listings from 400 radio stations

BOOK REVIEW INDEX
Provider: Gale Research Company
On-line through: Dialog Info. Services, Inc.
Subject: Periodical and book reviews

BOOKS IN PRINT
Provider: R.R. Bowker Company
On-line through: BRS Inc.
Subject: Books currently in print

CALL/SINKING FUND PROVISIONS
Provider: Chase Econometrics/Interactive Data Corp.
On-line through: Chase Econometrics/Interactive Data Corp.
Subject: Call and sinking fund characteristics for bonds

CHASE ECONOMETRICS/INTERACTIVE DATA CORP.
Provider: Chase Econometrics/Interactive Data Corp.
On-line through: Chase Econometrics/Interactive Data Corp.
Subject: Wide range of financial and economic data bases

CSS/QUOTES+
Provider: National CSS
On-line through: National CSS
Subject: Stock history data base

COMMODITIES FUTURES
Provider: Market Data Systems, Inc.
On-line through: General Electric Information Services Co.
Subject: Commodity futures contracts

COMPUSERVE INFORMATION SERVICES
Provider: CompuServe Inc.
On-line through: CompuServe Inc.
Subject: Multifaceted information service providing many data bases

DOW JONES NEWS/RETRIEVAL SERVICE & STOCK QUOTE REPORTER
Provider: Dow Jones & Co.
On-line through: Dow Jones & Co.
Subject: Business news and stock prices

DRI CAPSULE
Provider: Data Resources, Inc.
On-line through: I.P. Sharp Associates; United Information Service
Subject: Time series on economic indicators

FOUNDATIONS
Provider: The Foundation Center
On-line through: Dialog Info. Services, Inc.
Subject: Non-profit foundations

HARVARD BUSINESS REVIEW
Provider: Harvard Business Review
On-line through: BRS Inc.; Dialog Information Services, Inc.
Subject: Abstracts and comprehensive indexing of all articles in HBR from 1971 to present, plus some older articles; full texts available for articles from 1976

HORSE
Provider: Bloodstock Research Statistical Bureau
On-line through: Bloodstock Research Statistical Bureau
Subject: Thoroughbred pedigrees, breeding records, race records

ICC
Provider: Interstate Commerce Commission and Federal Railroad
On-line through: The Computer Company
Subject: Traffic and financial data

INTERNATIONAL SOFTWARE DATA BASE
Provider: Imprint Software Ltd.
On-line through: Dialog Information Services, Inc.; Knowledge Index
Subject: Microcomputer software

LEGAL RESOURCE INDEX
Provider: Information Access Corp.
On-line through: Dialog Info. Services, Inc.
Subject: Citations to law and law-related literature

LEGI-SLATE
Provider: Legi-Slate
On-line through: I.P. Sharp Associates
Subject: Contains complete history of all bills and resolutions introduced during regular and special sessions of U.S. Congress

MEDLINE
Provider: National Library of Medicine
On-line through: Dialog Information Services, Inc.; BRS Inc.; National Library of Medicine
Subject: Worldwide biomedical literature

MICROCOMPUTER INDEX
Provider: Microcomputer Index
On-line through: Dialog Information Services, Inc.; Knowledge Index
Subject: Microcomputer magazines

NATIONAL TECHNICAL INFORMATION SERVICE
Provider: National Technical Information Service
On-line through: BRS Inc.; Dialog Information Services, Inc.
Subject: Unclassified reports on government and non-government sponsored engineering and scientific research

SOCIOLOGICAL ABSTRACTS
Provider: Sociological Abstracts, Inc.
On-line through: Dialog Info. Services, Inc.
Subject: Abstracts of sociological literature

THE SOURCE
Provider: Source Telecomputing Corporation
On-line through: The Source, Source Telecomputing Corp.
Subject: Contains many information services

STANDARD AND POOR'S INDUSTRY FINANCIAL DATA BANK
Provider: Data Resources, Inc.; Standard and Poor's Corp.
On-line through: Data Resources, Inc.
Subject: Time series on industry groups

This listing is, in part, based on information from the *Directory of Online Databases* published by Cuadra Assoc., Inc., 2001 Wilshire Blvd., Suite 305, Santa Monica, CA 90403, (213) 829-9972

DBRSs can offer measurable benefits to most business people—if they select their DBRSs with care.

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Connect charge: $200, incl. training (deferred for home use)
Report charge: 25¢ to $5 each
Time charge: 40¢/minute

BLOODSTOCK RESEARCH STATISTICAL BUREAU
801 Corporate Drive
P.O. Box 4097
Lexington, KY 40544
(606) 278-0411
Charge: $1.75 to $16.50 per pedigree

BRS INC.
1200 Route 7
Latham, NY 12110
(800) 833-4707
Subscription: Charge depends on contract commitment
Telecommunications fee: $6 to $11/hr, depending on network
Connect charge: $16 to $30/hr plus royalties and telecommunications
Royalties: Charge determined by producer
Open access plan: $35/hr plus royalties and telecommunications; $50 start-up fee, credited to account

CHASE ECONOMETRICS/INTERACTIVE DATA CORPORATION
486 Totten Pond Road
Waltham, MA 02154
(617) 890-1234
Subscription: Depends on individual data base
Connect charge: $19.75/hr
Time charge: 16¢ per unit on-line, 8¢ overnight

COMPUSERVE INCORPORATED
5000 Arlington Centre Blvd.
Columbus, OH 43220
(800) 848-8990
Subscription: $39.95, includes five introductory hours
Connect charge: $5/hr, no monthly minimum; $22.50/hr prime time, two-hour monthly minimum; includes communication network

THE COMPUTER COMPANY
1905 Westmoreland St.
Richmond, VA 23230
(804) 358-2171
Connect charge: $1/hr
Other charges: 55¢ per 1000 charcters; 25¢ per CRU

DATA RESOURCES, INC.
24 Hartwell Ave.
Lexington, MA 02173
(617) 863-5100
Subscription: Depends on individual data base
Connect charge: $22.75
Time charge: 7.2¢ per CRU

DIALOG INFORMATION SERVICES INC.
3460 Hillview Ave.
Palo Alto, CA 94304
(800) 227-1927; (800) 982-5838 in CA
Time charge: $15 to $100/hr

DOW JONES & CO.
P.O. Box 300
Princeton, NJ 08540
(800) 257-5114
Subscription: Standard—$1.20/minute prime time, 20¢/minute non-prime, for news; 90¢/minute prime time, 15¢/minute non-prime, for quotes. Blue Chip—for non-prime-time users; lower rates. Executive—$50/month; lower prime-time rates.
Connect charge: $50

DUN & BRADSTREET, INC.
99 Church St.
New York, NY 10007
(212) 285-7669
Subscription: Contract required. Charge depends on number of units (one per report); minimum contract depends on type of service.
Access charge: Depends on type of contract purchased

GENERAL ELECTRIC INFORMATION SERVICES
401 N. Washington St.
Rockville, MD 20850
(301) 340-4000
Subscription: $40 to $50/month
Connect charge: $3 to $45/hr, depending on type of terminal device used and baud rate
Time charge: 16¢ per CRU; up to 10¢ per 1000 characters

I.P. SHARP ASSOCIATES
2 First Canadian Place
Exchange Tower, Suite 1900
Toronto, Ont., Canada M5X 1E3
Connect charge: 25¢ to 45¢ CPU charge; 70¢ per 1000 characters
Time charge: $1/hr

KNOWLEDGE INDEX
3460 Hillview Ave.
Palo Alto, CA 94304
(800) 227-5510; (415) 858-3796
Subscription: $35
Connect charge: $24/hr, including network fees

NATIONAL CSS
187 Danbury Road
Wilton, CT 06897
(203) 762-2511
Minimum charge: $300/month
Connect charge: $17/hr including telecommunications
Time charge: 27½¢ per application resource unit (ARU)

NATIONAL LIBRARY OF MEDICINE
8600 Rockville Pike
Bethesda, MD 20209
(301) 496-6661
Minimum charge: $15/month
Connect charge: $22/hr prime time, $15/hr non-prime time; telecommunication charges included

RAPIDATA, INC.
20 New Dutch Lane
Fairfield, NJ 07006
(201) 227-0035
Minimum charge: $100/month
Connect charge: 16.7¢/minute; national toll-free access
Time charge: 30¢/minute, 300 baud; 50¢/minute, 1200 baud

SOURCE TELECOMPUTING CORP.
1616 Anderson Road
McLean, VA 22102
(800) 336-3366
Subscription: $100, includes user's manual, lifetime subscription to newsletter and other publications
Connect charge: None in 480 cities; toll-call charge for outlying regions
Time charge: $20.75/hr prime time; $7.75/hr non-prime time; $5.75/hr economy rates.

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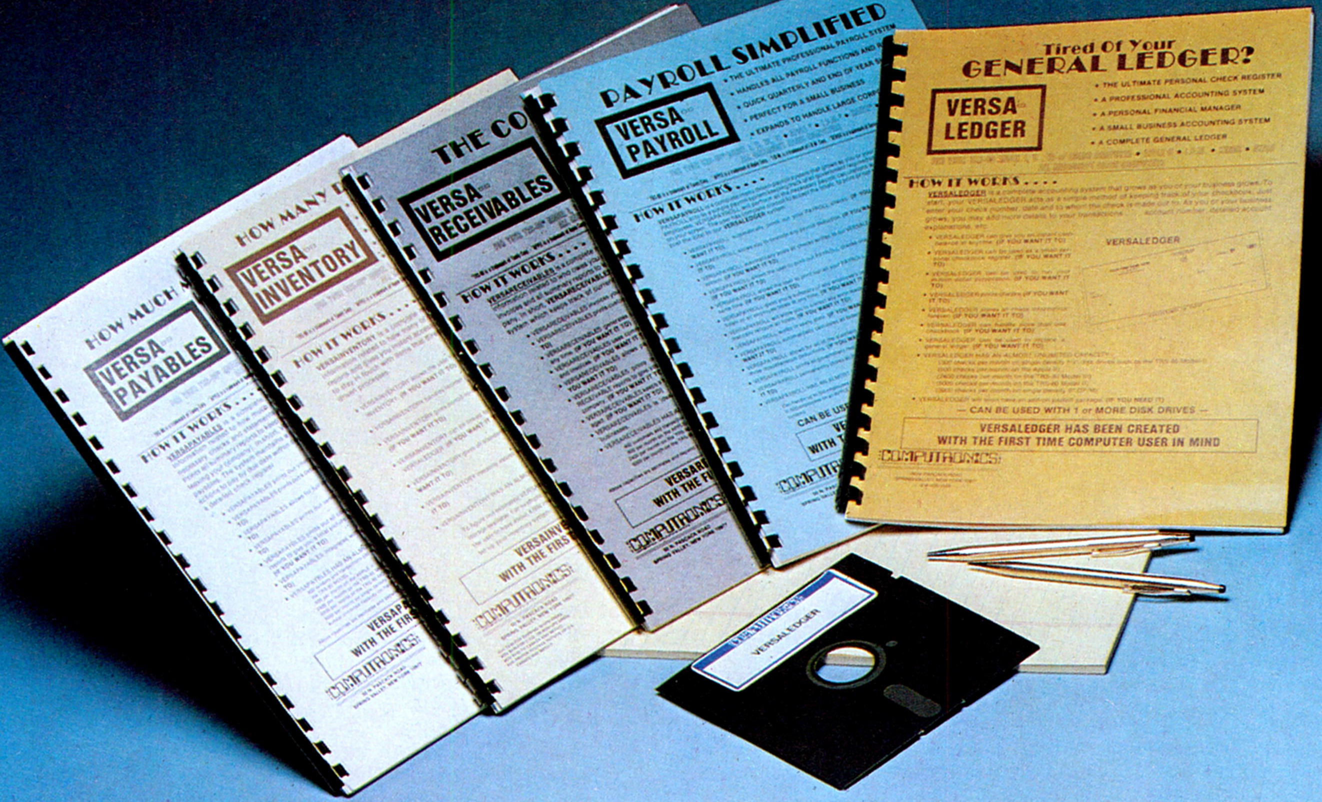

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He believes his use of the DBRS is responsible for a significant growth in business.

DATA BANKS

(continued from page 111)

about every 45 days," Bashaw continues. "When I'm getting ready to do the newsletter, I review all the news that has an impact. I excerpt from that and make comments about it, and advise my clients about what's going on." In the old days, before DBRS, Bashaw tried to be diligent about checking and clipping the daily newspapers, with varying success. When it came time to prepare his newsletter, he was confronted with file folders filled with ragged, rapidly yellowing clippings. Then he discovered personal computers and, shortly after, DBRS.

After a typical 12-hour day at the office, Bashaw goes home, does whatever a mortgage lawyer does when he gets home, and around midnight, sits down at his Apple and "logs on" to his DBRS. "I keyword-search UPI (United Press International) under the word 'mortgage' and pull in any and all articles that mention the word . . . ." If he misses a night, the data base fills him in on what happened the day before. First, he gets a headline synopsis of available articles so that he can select the ones he wants to read. "If they're good, I capture them in a buffer," he explains, for printing out hard copies after he "logs off." Actually, he doesn't have to do that; the DBRS will mail him hard copies if he requests it (for a fee, of course, but a relatively nominal one). He also searches other news data bases for relevant national, business, regional, and congressional events that could affect his clients.

Bashaw believes his use of the DBRS is responsible for a significant growth in business. The quality of his newsletter, which is, after all, generated by his data-base searches, has enhanced his reputation as an expert. As a result, there has been a marked increase in the number of speaking invitations he receives. That, he claims, has increased his exposure and, therefore, his clientele. His firm, Pierce & Bashaw, currently oversees the Illinois holdings of national clients, but he plans to expand his activities into other states. He can do this because of his expertise on federal and state mortgage laws—expertise he has developed by keeping abreast of the field via his DBRS.

Portfolios with DBRS

Bashaw also uses the DBRS to take care of his personal business. "About a year ago," he says, "I chose to invest my IRA funds in stocks." Now he uses the DBRS to stay abreast of his portfolio as well as the stock market in general. "I save my stock prices on my buffer," he explains. "When I log off, I bring up my VisiCalc [spreadsheet program] and plug in the current prices. I press a button and change the value of the current price on my matrix, and it lets me know how I'm doing." Bashaw is on-line almost every weeknight. His average time: 24 minutes.

The researching capabilities of a DBRS have had a powerful impact on Tom Trone's business, too. Trone is co-owner (with John Kiser) of Lox, Stock & Bagel, a chain of three restaurants in Champaign and Normal, Ill., with ambitious plans for future expansion.

The restaurants are sort of eat-in gourmet delicatessens, and while they would appear to be quite similar, there are differences among them. One is located on a university campus, another in a downtown business district, and a third in a regional shopping mall. (Five more are now "on the drawing board," according to Trone; ultimately, there will be 14.) "We have three different markets and three different customer profiles," Trone says. So while the menus may look the same, the rates of consumption of the various items are likely to be different. That, in turn, affects pricing and profit. Pricing and profit are carefully monitored by Lox, Stock & Bagel—mostly through a DBRS. About a year ago, when

HOW TO FIND ON-LINE DATA BASES

Although finding facts through a DBRS is easy, finding the right data base can sometimes be a problem. Some suggestions to aid you in your search:

Ask the executive director or secretary of your trade association or professional society. Many such organizations have their own DBRSs or can recommend ones that are directly related to your work. Also ask around among your colleagues. Most people who use DBRSs like to brag about it.

Write or telephone the large DBRSs and ask about data bases that serve your specific needs. Chances are you'll find what you're looking for among one of these three: CompuServe Inc., 5000 Arlington Centre Blvd., Columbus, OH 43220, (800) 848-8990; Source Telecomputing Corp., 1616 Anderson Rd., McLean, VA 22102, (703) 734-7500 or (800) 336-3366; and Dialog Information Services, Inc., 3460 Hillview Ave., Palo Alto, CA 94304, (800) 982-5838 (CA) or (800) 227-1927.

Pick up a copy of *Data Bases for Business* by Van Mayros and D. Michael Werner (Chilton Book Co., Radnor, PA, 1982; $19.95 paperback, $27.50 hardbound), an excellent guide to using DBRSs. In addition to a full explanation of what DBRSs are and how to use them, the book contains a directory of about 400 DBRSs with details such as names, addresses, telephone numbers, the vendors through which the services are available, and cross-referenced indexes so that you can find the data bases by name, by vendor, or by type of business or service.

There are other, similar database directories that tend to be larger and more expensive. Check the business section of your local public library, or, if you work for a large organization, talk to your company librarian.

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CIRCLE 24

The DBRS's most important competitive advantage is its communications feature—electronic mail.

Trone first began using The Source, he explains, "we were in the process of making up new pricing scheduling, looking at our purchasing decisions and prices that we could lock in. We tied in to the Commodity News Network. From that, we got information about grain price movements, meat price movements, and so on. We actually make decisions on future purchasing and pricing based on information that we get through The Source."

Trone also uses his DBRS for what he calls "basic research." "In the process of expansion," he says, "we need a lot of information. In a town like Champaign, or in any community, it's difficult to get a broad base of information to make decisions with. The Source brings that information right here into the office. We use their research bases, where we can go in and research a topic of very broad scale, over a wide range of information bases, right here." Trone would not discuss which broad-scale topics he reviews, but certainly, if he plans to open restaurants, he will be looking at economic trends, consumer eating habits, area demographics, and other considerations necessary for determining whether, where, and how to establish a restaurant. All that information is available on DBRSs. "We can get information that deals specifically with what we're doing and can save us the old trial-and-error process. At least when we do a trial now," he says, "it's going to be an educated one."

Getting market updates

Michael Merker also uses a DBRS to monitor economic trends that relate to his business. Merker is the manager of a Xerox retail store in Great Neck, N.Y. Although the store, one of a chain of 52 outlets, is owned by Xerox, Merker is expected to run it as though it were his own business. Thus, while the company dictates the line of products to be carried—which consists of a full line of office machines, including the Xerox copiers and the 820-II personal computers—it's Merker who's responsible for sales, advertising budgets, promotions, and special offers.

"I use the business update on a regular basis," Merker says, "just to keep up with what's happening in the market. I can't always get to read the entire *Wall Street Journal* every morning—the DBRS allows me to look around and monitor what's going on in retail and the business community as a whole. If everything indicates, for example, that there's a recession, I know I should cut back on my inventory levels and perhaps stress my sale items a bit more—alter my advertising strategies. It allows me to change my 'head set.'"

But for Merker, the DBRS's most important competitive advantage is its communications feature—electronic mail. A "sender" can transmit a message to the central DBRS computer which the "receiver" can access whenever it's convenient. Inasmuch as all 52 Xerox stores are on the DBRS, Merker can play all sorts of inventory games. "There are times," he admits, "when I'll take an order here and I just physically don't have the merchandise. If I go through my normal ordering system (through a mainframe computer in Dallas) . . . it takes a week and a half for the merchandise to arrive . . . . But if I use my distribution list, I can send a 'letter' to all 52 stores and say, 'I need 50 Toshiba calculators . . . .' Within an hour and a half, I can usually get my entire order shipped . . . ." The accommodating sibling store ships by one of the express services and delivery to the customer is in 24 to 36 hours.

Merker has even used the DBRS electronic mail to beat out one of Xerox's field representatives who called on a potential customer at his office after the prospect had shopped in the store. The field rep promised delivery of a copier and computer in

(continued on page 166)

DATA-BASE DIVERSIONS

All is not strictly business on data base retrieval systems (DBRS). Among the data bases offered by The Source and CompuServe are software programs that can be downloaded to personal computers so technophiles can experiment at their leisure. And there are, of course, games.

Some subscribers use the electronic mail facility to vent their political passions. Mike Sidoric, of Informedia, likes to keep tabs on the troubles plaguing the social security system. "As a sole proprietor," he says, "I'm afraid that the social security system's demise is going to increase our tax burden considerably. They're going to look to anybody who's making money to help bail it out." So he scans the DBRS wire services for social security news, especially in Congress. "I can find out what's going on in the hearings and who's saying what, and use electronic mail to send him a tacky mailgram."

If he used CompuServe, Sidoric wouldn't have to write his own letters. He could call on the services of Lobby Letters of America which, upon receipt of the barebones facts and an indication of your mood, will compose and dispatch an appropriate letter.

Also on CompuServe are special interest groups, among them a CB group whose members emulate CBers on their computers, software and hardware users groups, the National Satirists, a work-at-home group for the self-employed, and World Wide Exchanges, for people who like to travel and enjoy exchanging facilities. Other special interest groups abound on both The Source and CompuServe, and it's easy to form new ones via the "bulletin board" facility that both services provide. Computer pen pals are accessible through the bulletin boards, as are advertising opportunities and requests for anything.

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CIRCLE 47

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CIRCLE 49

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The fun part is accessing the information. There's a natural love affair between kids and computers. Seventh-grader Ronald and his 15-year-old sister, Ingrid, are proof of this. "It really makes learning fun," Ronald explains. "I've already used the electronic encyclopedia more in just a few weeks than I have our printed encyclopedia in my whole life."

Both Ronald and Ingrid have found the easy-to-use encyclopedia and the various news-oriented data bases invaluable for a variety of school projects, from special reports to biographical data.

But the sports data base for Ronald and the movie reviews for Ingrid are the real passion. "Some times I'll go into the encyclopedia," confesses Ronald, "just for an excuse to go into sports later. They've got everything."

For Elinor, the News/Retrieval shop-at-home service "makes it easy to comparative shop. But I'm most excited about the way the kids are learning to become computer literate, which will be so important later on in their lives."

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As for Harold, his initial enthusiasm for News/Retrieval hasn't changed a bit. "As far as my investments are concerned, it's already paid for itself for life. I have more control over my investment decisions than ever before."

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Taking A Stand For Computers In Education

How one teacher turned computer learning into a class act

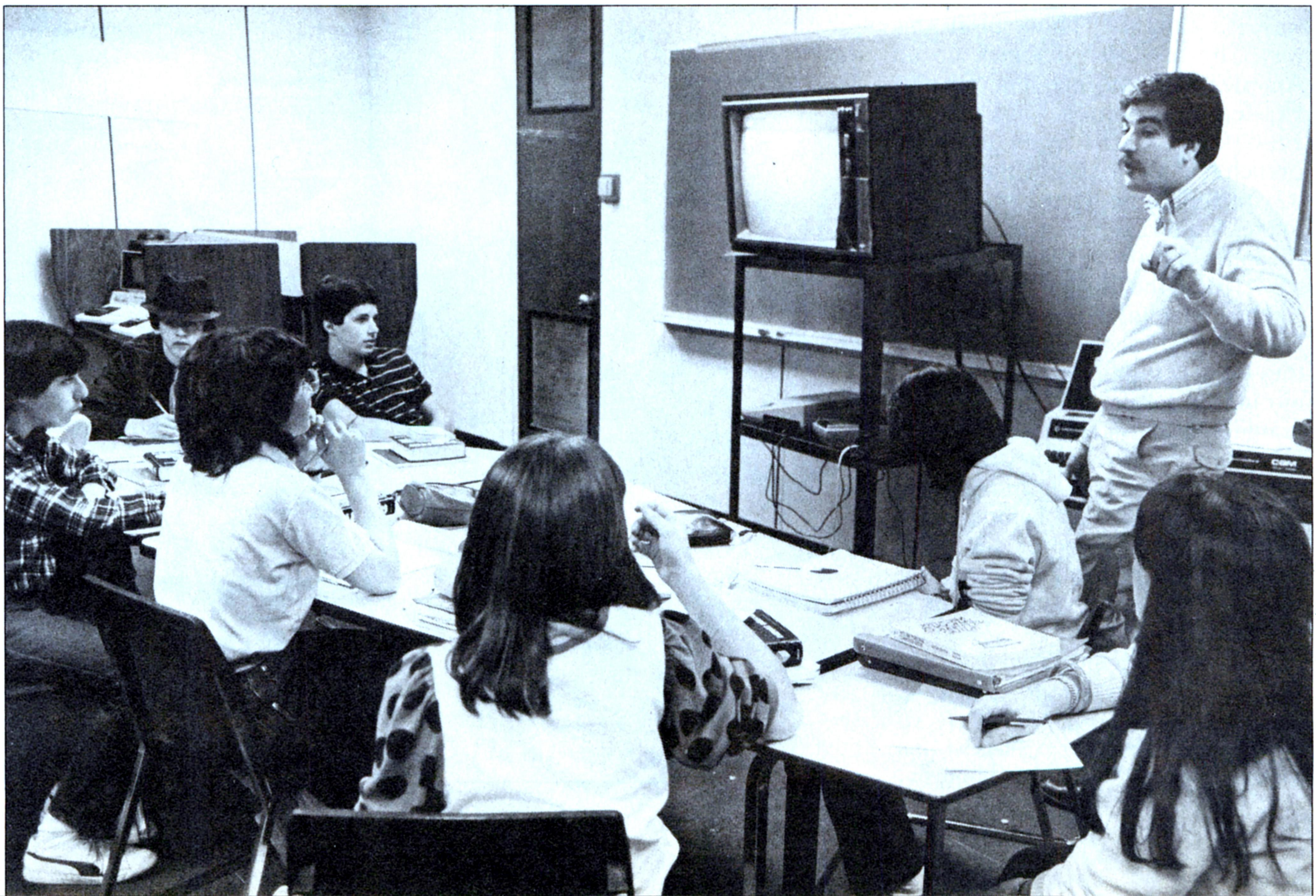
by Tony Howarth

At a time when many of the nation's educators are foggy and perplexed about where the personal computer fits into the educational scheme of things, one teacher at Blind Brook High School in Rye Brook, N.Y. is remarkably clear-eyed about it. David Press, the 36-year-old computer-instruction coordinator for his school district, feels the greatest attribute of the personal computer is its ability to foster self-esteem and independence. He is using personal computers to teach kids to run their own lives.

Initially a member of the school's math department, Press now devotes himself to teaching computer science. "The most important job of any educator," Press says, "is to help kids see themselves, help them understand who they are, and help them realize their own potential."

Tony Howarth is a free-lance writer interested in computer applications in education.

In Press's 10th grade program, he teaches the fundamentals of computer science.



photos by Andy Levin/Black Star

It's not the kind of comment you would expect from one whose specialty is numbers, theorems, and cut-and-dried right-or-wrong answers. But Press does not approach his job in such a traditional way. "I hate the idea of producing lockstep kids wearing blinders who are ready to take on the mechanized world in a mechanized way," he says. "I'd much rather have a kid study computers, do well at it, and do well with other things—be together as a person."

And Press feels that it's all in the way it's taught. "Think of it this way," he says, "if you pick up an American kid and put him down in France—in French-land, if you will—the kid will learn to speak French and to survive in the French way of things. So what I try to do is to create a Math-land, a place where the kid will learn to speak Math and to survive in the Math way of things."

The personal computer has allowed Press to show his students how they can manipulate shapes, sizes, motion, color, and space in their graphics displays. He feels that by doing this they realize they can know more and understand infinitely more concepts than they did before. In addition, students discover that they can think through an action at the keyboard, rethink it, and rethink it yet again.

"If a youngster sits down in a computer environment which has become natural to him—Math-land—and types out 'FD 30 RT 90' four times, the graphic will form a square," says Press. "The kid has now taught the machine to square. Think about that for a minute—this seven-year-old has created a square, which is just as powerful as the programmer's word, FD.

"For that youngster, it's like inventing a word and having it wind up in Webster's," he says. "What power it gives the kid—what control over the world he lives in. I sure never had that kind of thing happen to me when I was his age."

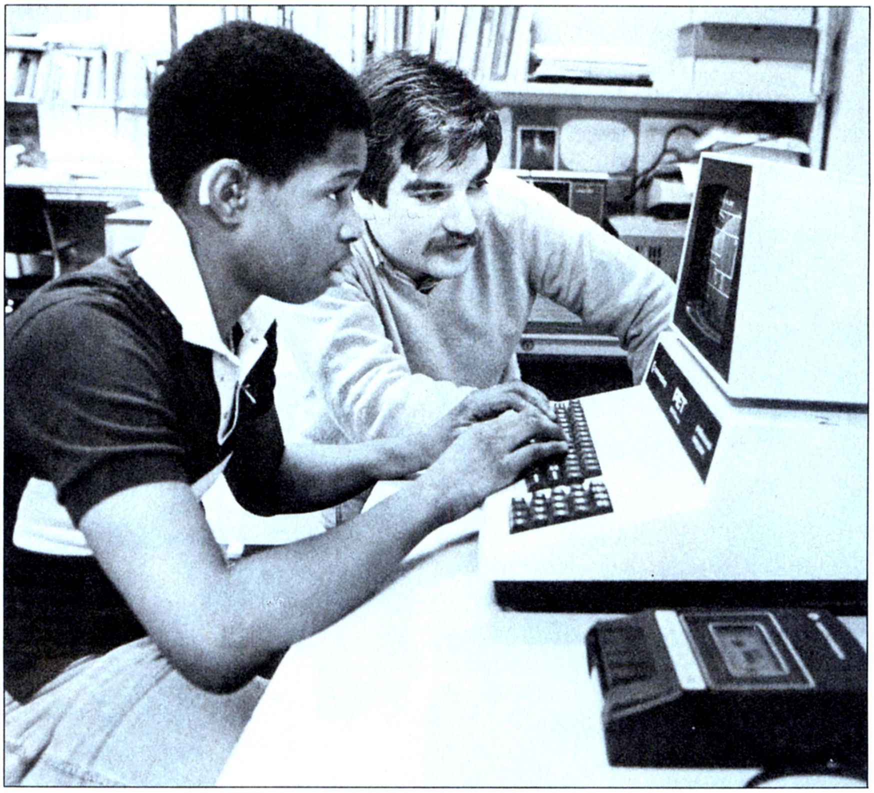
Start at the very beginning

To gain this familiarity with computer technology, Press believes kids have to start young. This means introducing the curriculum in the lower grades—even as early as first grade.

Press feels kids should get a basic introduction to computing in the first and second grades. This instruction should come from the classroom teacher. The children should learn to type at the keyboard, to communicate with the computer, and to realize that the computer can respond to them.

Press thinks the interaction between teacher, child, and computer can be used to teach educational concepts in an interesting way. A good example, he says, might be an arithmetic game in which the child must first draw a fishhook on the screen before he can solve the problem. Then he would have to manipulate the hook on the screen to select the answer to the problem from a list of possibilities.

In grades 3 through 6, Press would like two curriculum streams to be at work. In one stream, classroom teachers would introduce the children to Logo, a computer language developed by Seymour Papert and which, through the use of "turtle"

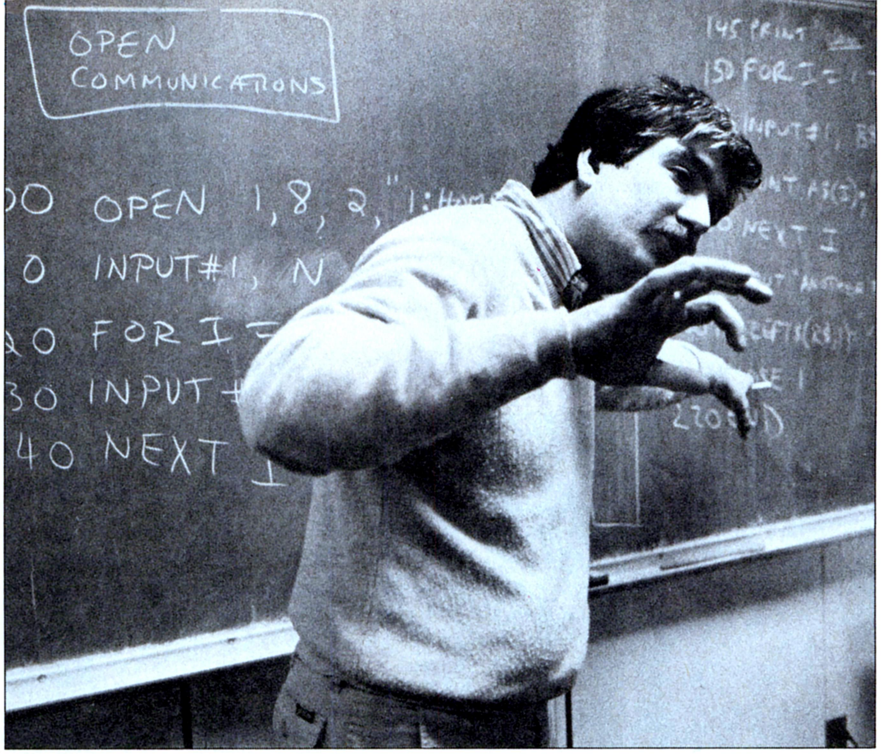


The computer has helped Press show his students how to manipulate graphics. He feels that this gives high schoolers a better understanding of the concepts involved.

Computer instruction is coming into the classroom.

graphics, allows children to build intellectual structures through estimation, interaction, experience, and revision.

Press cites Logo as a prime example of how students can be taught to control the computer. The language was designed to foster just this sense of control and to give children a chance to play with concepts so sophisticated that many high-school students have not studied them. "It makes sense, doesn't it," he asks, "to think of velocity as so-and-so many turtle-steps per second?"



The second stream in grades 3 through 6 would concentrate on computer-assisted instruction (CAI) work. There is a place for CAI, Press says, but it should not be considered, in and of itself, a "curriculum." He'd like to see a lot of individualized instruction in grades 3 through 6, pulling kids out of class for help, if need be. When a student can't multiply—can't carry when multiplying with two-digit numbers—it could be useful for him to work with a program that gives him practice multiplying and points out what the concept of carrying is.

Bringing personal computers into the elementary school classroom presents one problem—training the classroom teachers. But one point to remember is that computers do not replace the classroom teachers in any way. "What has begun to happen," says Press, "is that computer instruction is coming into the elementary classroom the same way music is brought in—on an occasional basis by a specialist. It's the wrong approach. There are lots of folks who wish we could go back to the days when the elementary teacher had her own piano and would pound out a few songs in between the spelling lessons."

The specialist in computer instruction should take over in the upper grades, such as grades 7 and 8,

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Kids should understand that BASIC is only one of several computer languages.

where the kids should be introduced to BASIC. This program is now being offered at Blind Brook as a 10-week elective course. "I like to teach BASIC in such a way that the students learn how to apply it to problems in business, math, social studies, and science," Press says.

"There's a tradition of computer teachers coming from a math background and seeing the computer only as a means of teaching math. That's too narrow," he says. "The kids should understand, at this point, that BASIC is only one of several languages which can be used to communicate with the machine and that in certain situations other options may work better."

One computer language Press would not teach is COBOL. In his opinion, "It sends kids to a narrow place, to a certain dead-end place in the business world, rather than opening them up to all the promise of this machine and the world it works for." He admits there are times when everyone has to face one of these narrow places when we focus on what kind of work we want to do in life. But he feels this kind of decision doesn't really belong in a secondary school.

Up to the senior circuit

This fall, Press will institute a required survey course for all students in the ninth grade. The course will introduce kids to personal-computing applications that can help them in their other high-school courses.

As computer use at the secondary level expands—social studies teachers using the machine for survey questionnaires, math teachers graphing multiple trigonometry functions, physics teachers diagramming resultant vectors of force—concepts will be easier to understand and teach if the students are given an overview of the computer's functions.

There are also specific skills students could master using the computer—skills such as word processing, manipulating data in a research project, and searching through established data bases.

Of all the innovations Press has planned, only the program for grades 10 through 12 is firmly in place at the moment. In these grades, Press be-

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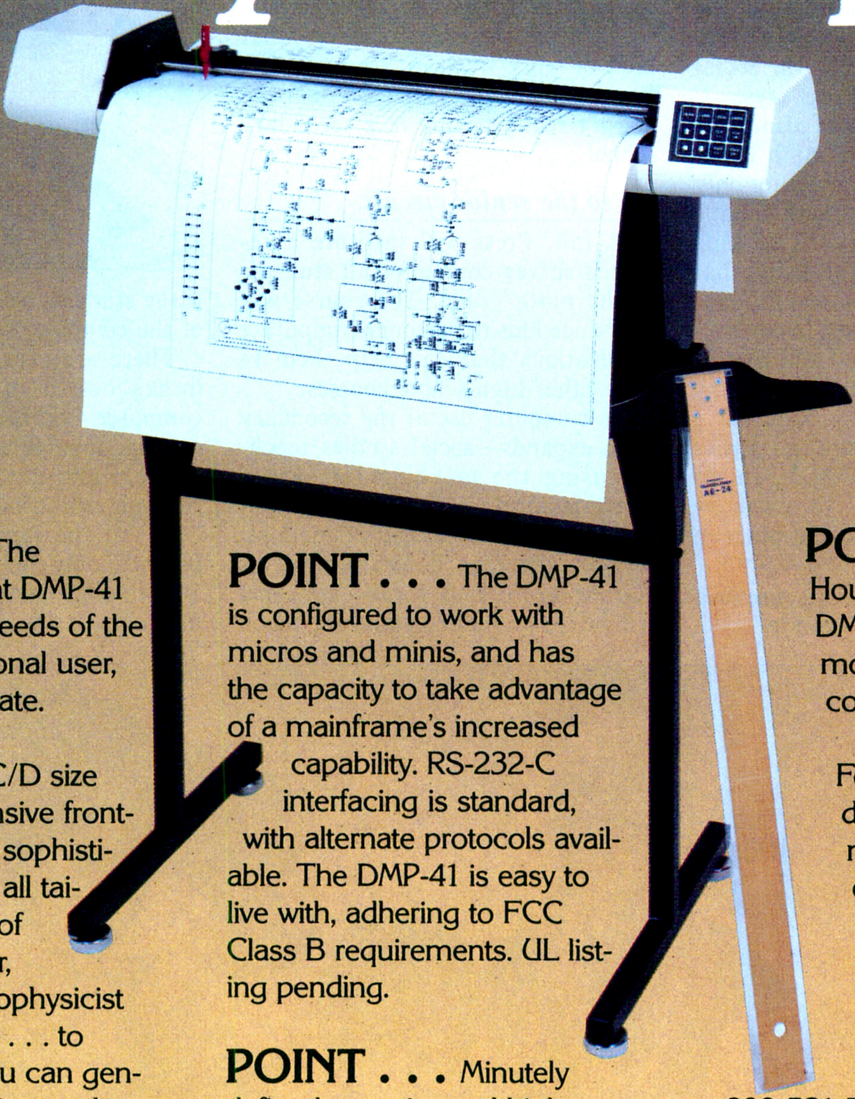

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lieves the students should really get involved in computer science. And some kids have become involved.

One student has a part-time job with a local firm translating programs for one particular computer to two other machines. The editors of the school newspaper are producing the paper with word-processing software. And two other students have devised an inexpensive way to control a toy car by hooking up the remote control transmitter to a computer.

"The kids took their soldering guns down to the basement and played around like crazy," Press says. Now they're talking about marketing it and hooking up a light sensor to the car so that the computer can control its turns. "Maybe they'll build a robot vacuum cleaner before long!

"There are certain kids who have 4.0 averages in school and will do well within any context," he says. "But there are other kids who question everything—you know, the kind who are labeled troublemakers because they won't settle down and accept the word that's coming at them from the front of the room. They're the best kind."

Press loves to take the initial interest he finds in some of his "arcade zombies" and turn it around. They learn that when they play arcade games, the computer limits—and thus controls—their choices. It doesn't have to be that way. Press shows them that the computer can be a tool they control.

The kids feel it too

Interest in computing is one thing, but at Blind Brook interest has become almost an obsession. Recently Press acquired Spritelogo. Three hours after the students saw it in action for the first time, with darkness settling in on the parking lot outside, eight students were still clustered around the giant display screen. They heckled the operator, homework in front of them, absorbed by the changing configurations on the screen.

There is a place for computer-assisted instruction in the schools, Press feels, but it should not be considered, in and of itself, a "curriculum."

"What I'm doing at Blind Brook is good," Press says. "But I won't take the credit for what's happened. I give credit to the machinery; it's made all the difference."

When Press began at Blind Brook, there was just one man, Tom Reistetter, teaching a single-semester computer course. The only computer in the school was an old Hewlett-Packard 2000-F linked by a typical time-sharing plan to a mainframe run by the regional board of cooperative educational services.

Reistetter was typical of thousands of computer teachers in one way—he was on the staff when the administration decided to install a computer course, so he was given a machine and told to teach the kids what it was all about. But he was unusual in another way—he felt a tug at his conscience at being asked to teach a course in which the students knew more than he did.

Reistetter asked to be relieved of the assignment and the school went looking for a computer specialist. That's when they found Press, who has a computer science degree from the University of Wisconsin. The school's principal at the time, David Schein, told Press he would be teaching some traditional math at first and "Let's see what happens."

What happened was that the kids at Blind Brook loved what Press had to offer. Enrollment in his classes increased steadily, forcing his program to expand to the point where now Press teaches four classes a day—all 10th, 11th, and 12th grade students. In September, he was appointed computer coordinator for his entire district.

Press started acquiring equipment for his program—six PETS, one Atari, one Apple, and one Imsai. In the entire district there are eight PETS in the elementary schools and four IBM Personal Computers that the schools are using with the John Henry Martin "Write-To-Read" project.

Press came by the equipment in fairly traditional ways—half the machines were donated by the Parent Teacher Association. "Listening to so many other teachers in this part of the world, this is typical," Press says. "Only after the PTA has put the machines in the school do school boards begin to pick up on the momentum."

This is exactly what happened at Blind Brook. Once the PTA had paved the way, the remainder of his machines were acquired through normal funding processes with a minimum of difficulty.

In 1977 Press decided to order an Apple, but in the time lapse between his decision and the actual purchase of the machine Commodore made an offer on its PET personal computer that he couldn't refuse—"Buy two, get one free."

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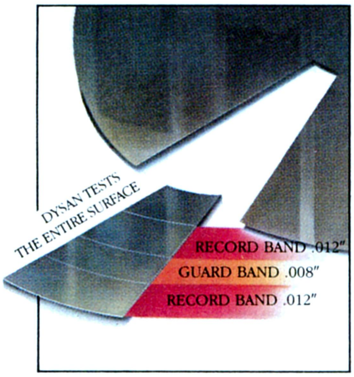
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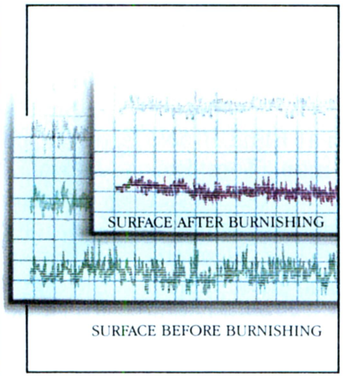

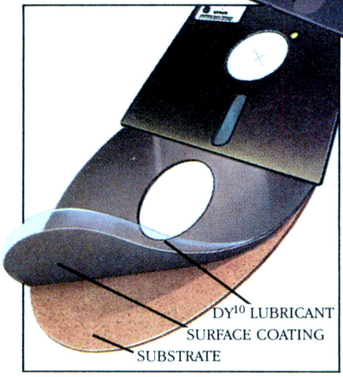
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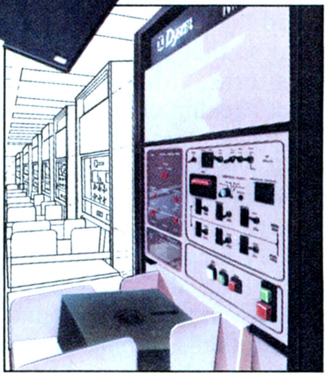

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"I plan to make sure the computer will serve no one god. It has to serve everyone and everything."

So Press wound up with three personal computers and the 2000-F terminal. With the acquisition of these computers, the program really began to take off. "If I had 16 kids using those four machines, I was able to give eight of them a lesson in one class period while the other eight were at the keyboard."

Making future plans

Now that the program is in working order, the next item on the school district's agenda is to lay out computer-education goals for the future and see what can be done to achieve them. Press has been meeting regularly with a computer advisory committee of 25 people—parents, staff, and students.

"I have my own vision," he says, "which shouldn't fall too far away from the vision of the whole group." The school administration, like most administrations, wants every child to be computer literate. But they don't really know what the term means. They do know that public pressure for computer literacy is mounting. "We're talking," Press says. "We're trying to formulate some coherent goals and trying to see just how they can be implemented.

"Whatever happens, though, I plan to make sure the computer will serve no one god," he says. "It has to serve everyone and everything—creativity, math, science, the humanities, self-esteem, the classroom teacher—all the different curriculum and personality options that make up a vigorous community like ours."

The extent of the urgency

Press senses this computing urgency on two levels. On the one hand, he feels it's of the utmost importance that we get a handle on what's done in the schools, making sure it is being done constructively and in a way which is encouraging to kids. That means, among other things, that the computer should not be used just to deliver instruction.

Second, he says, the outside world has completely adopted the computer—it's in business, in cars, in stores, in our telephones—so we have to adopt it in the schools too. We have to make haste to ensure that our youngsters are ready to use this tool in meaningful and productive ways.

Press's thinking stems in part from his background in teaching at alternative schools—one in Trenton, N.J., and another in Queens, N.Y. He enjoyed the experience and says it "woke him up. The schools were more of a family than a school."

But the schools were not well-equipped. They were run on a shoestring and Press had to accept the lack of equipment as part of the price of making what he thought was a real contribution to some troubled lives. "I think that if we had had all the things at that time that the personal computer provides us with now, we could have turned those kids right around."

The alternative schools were populated by students who had broken out, or had been thrown out of "main-line schools," because they were unable to deal with the demands of the schools and of society.

"Papert's dichotomy of educational philosophies works in these schools," he says, "because main-line schools tend to emphasize stuffing them with facts—SATs and all that—something these kids resist. What they really need is to be stuffed with skills." Give kids more skills, Press believes, give them more control, a greater feeling of power over a certain piece of the world and you give them greater mastery in other parts of their lives.

It's not something that can be tested. It's the hidden benefit that can't ever be recorded in a teacher's lesson-plan book. But when students master the machine, they are really learning the exciting dimensions of their own potential, their own power to grow and to discover and to control the world around them.

For kids who have been hemmed in—and so many of them have—by schools, by the street, by other kids, by adults—this sense of control is pure dynamite. "Let's face it," says Press, "teaching computers should be listed as one of the humanities.

"What's fascinating," he says, "is that the people who ran those free schools were anti-technology to the core—convinced somehow that machines had a stranglehold on human development." But now, he believes, those same people are carrying the torch for high-tech, and especially for its deployment in the schools.

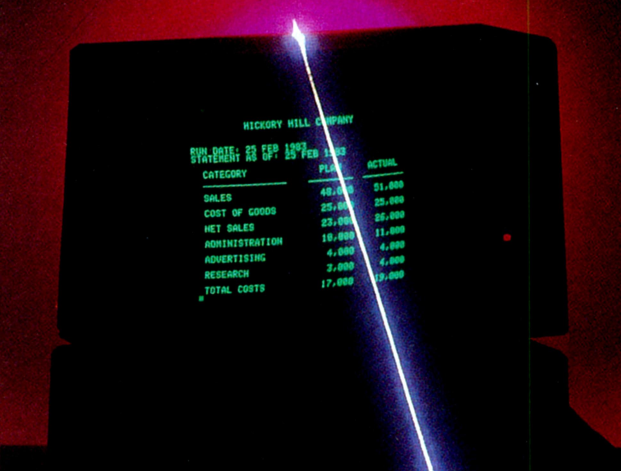
According to Press, the personal computer cuts through a lot of the red tape schools are caught in. The computer can be used to develop curriculum materials on its own.

Press feels students who aren't computer literate by the time they leave high school will fall behind in the adult world. "I see my kids going from here to college with a terrific edge over other kids."

But for Press, above all, the computer is a tool which his students must learn to use in human and humane ways. The people who design the equipment must take these factors into account. This goes for the software too—it's got to be geared to helping people use the machine. "People who create software have to understand the population they're trying to serve or there will be mismatches and misgivings."

Press hopes he can do something to help turn the corner on that part of the computer picture. He wants to continue to teach computing as if it were one of the humanities. But that's the point of his teaching, too. Fulfillment is everything. "We must not deify the machine," he says, "nor must computing be taught as an end in itself."

And perhaps, he says, if his students can maintain the humanistic attitudes he wants to foster, they can go out and make the machines work even greater miracles. ■



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Copying Computer Software: What Risks, What Penalties?

A branch of the law specializing in computers and electronic information dates back to the first mainframes. Much of this early computer law was concerned with contracts with vendors for hardware and software. Today those and other concerns are coming into prominence with the advent of personal computers as a consumer purchase. Some of the legal questions raised by the development of personal computers are traditional legal questions recast for the electronic medium; others are wholly new questions raised by the personal computer's unprecedented capabilities.

In this new column on computer law, Personal Computing *intends to explore these questions and what they mean to you, the personal computer user. This month the first column explores copyright law, and examines the legal implications of copying or modifying software. The column was prepared in consultation with Daniel T. Brooks of Computer Law Advisers in Springfield, Va. Involved with computer law for two decades, Brooks holds degrees in law and electrical engineering from Stanford University. He is also the secretary of the 10-year-old Computer Law Association, a professional society independent of the American Bar Association.*

The author of a software package can protect his rights of ownership in four bodies of law: trade secret, contract, patent, and copyright. In fact, a given software package may actually be protected by more than one set of laws. But commonly, personal computer software is protected under copyright law.

Copyright is federal protection of intellectual property. According to the 1976 Copyright Act, works written after January 1, 1978, are automatically protected by copyright. Registration of that copyright with the Copyright Office of the Library of Congress is an elective procedure.

Two elements are needed in order to take out a copyright—the author's ideas, and the tangible expression of those ideas. The idea for a plot of a novel is not subject to copyright, but the novel itself—the expression of those ideas—is. Similarly, the idea for a spreadsheet computer program cannot be copyrighted, but a specific computer program written to do the spreadsheet can.

Congress specifically intended the 1976 Copyright Act to cover computer programs as a subcategory of literary works. Compressing the substance of several sections of the Copyright Act into a single statement, copyright law protects 1) original works of authorship 2) fixed in tangible media of expression 3) from which they can be perceived, reproduced or otherwise communicated 4) directly or indirectly, with or without the aid of a machine or device 5) for a period of more than transitory duration.

Under the Copyright Act, the author of the computer program is the owner of the copyright. Generally the author of the program is the person who writes it. The major exception is for employees who wrote the program as part of their job; in that case the employer is considered the author. The copyright owner has five exclusive rights. He is the sole owner of the rights to reproduce his own work in copies, prepare derivative works based on the original, perform the work publicly, display the work publicly, and distribute the work to the public. Those rights are divisible—that is, the owner can split them up and assign them to others as he desires. He can, for example, sell distribution rights for his program to a software manufacturer.

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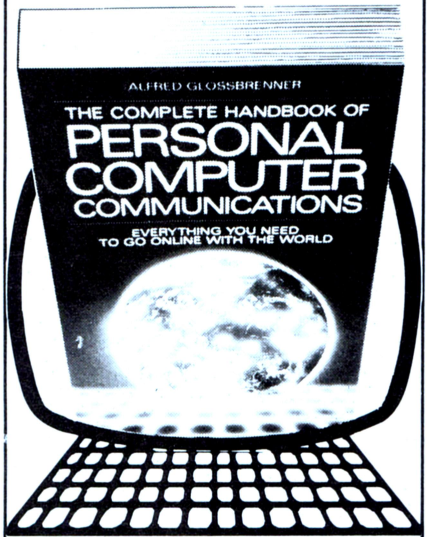
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CIRCLE 57

doesn't, in most retail situations you probably have a purchase.) The license accompanying a leased copy is a contract which spells out the rights you have. To ensure its enforceability, some manufacturers require that a prospective user sign and return a copy of the license agreement before the company will deliver a fully executable version of the software. Usually the license terms for a leased disk are more restrictive than the ones governing owned copies under copyright law. The basic principle with licenses is that unless the license says you may do something, you may not do it. Unless the license gives you explicit permission, you may not copy the program. You may not modify it in any way. You certainly can't make copies and distribute them. There is a concept of "fair use" in the Copyright Act covering how much use you may make of someone else's literary material for your own purposes, but personal computers are so new that it is not clear how fair use applies to computer software.

Assuming you bought the disk, or that the license agreement permits you to modify the program for your own use, one common question is how much do you have to modify a program before it's yours? The answer is you can't modify it enough to make it yours. If you add new ideas, logic, coherence and design while retaining parts of the original program code, it's not clear what the resultant work is. It's probably two works: your adaptations and the author's original. In that case, if either of you wants to distribute the modified program, you have to get licenses from each other.

When infringements are pursued

The typical home user doesn't really care about all these legal points. He's going to copy or modify a program because he needs to. So is the average computer user in an office. The single biggest threat to the distributors of computer programs is the copying that goes on in the commercial context. About 85 percent of microcomputer sales are to Fortune 500 companies and professionals, making business users the biggest segment of the market. In the office environment the employer is often the purchaser and copies are routinely made for the benefit of fellow employees.

In order to pursue an infringement, the author or manufacturer has to find out that a violation has occurred. That may seem obvious, but discovery isn't always easy. The individual user in the home or office is often immune from prosecution simply because it's impossible for the manufacturer to police every individual personal computer user in the country. There are instances where manufacturers have pursued computer clubs for wholesale copying. Microsoft's reported action against the Home Brew Computer Club on the San Francisco peninsula in 1976 is one example. And there are many stories of manufacturers' representatives making unannounced visits to computer clubs to warn members against copyright violations.

Software manufacturers rarely sue a commercial customer who buys in large volume and whom they'd like to keep. So they don't often pursue a violator if they think a lawsuit will put a damper on future relations. More often they go after the professional pirate who is making and distributing black market software. They also tend to pursue an employee who goes out the door with the tape trailing from his pocket and sets up a competing business, or the bitter rival down the street who tried to steal their secrets. There are cases of customer-competitor lawsuits in which a user licensed a program, made some modifications and thought he had his own program, and then went into business in competition with the original manufacturer.

Finally, it has to be worth it to the prosecuting party to pursue charges. If the cost of a lawsuit threatens to

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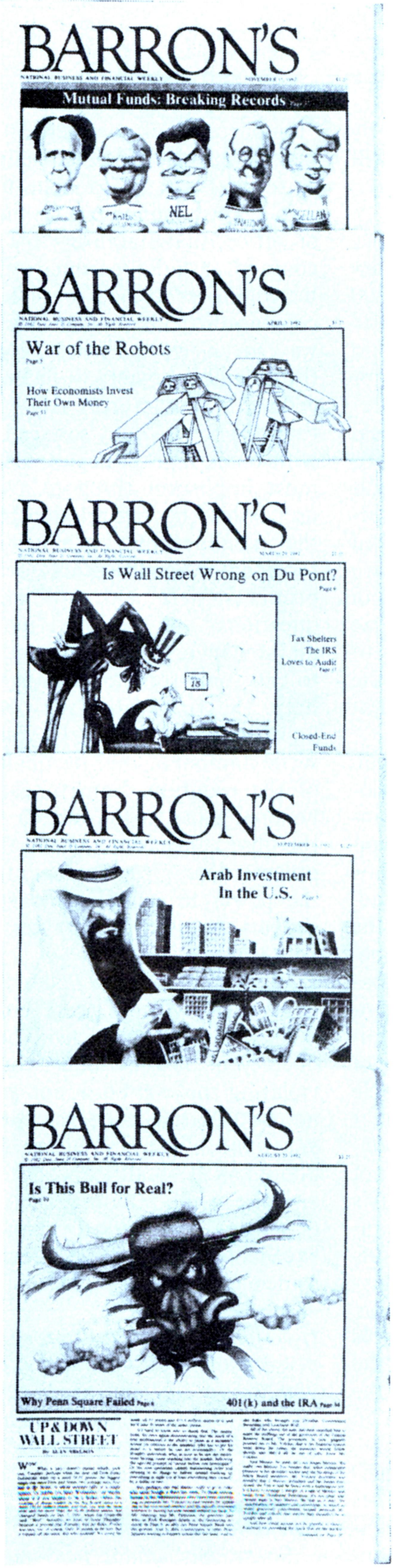
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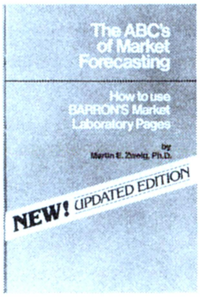
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CIRCLE 58

GEMS OF WISDOM

Avoiding Explosions

Don't use more than one electrical wall outlet when plugging in your computer, terminal, printer, or other interconnected equipment.

I learned this lesson not from a manufacturer's manual, but from watching an "expert" in the business plug in his equipment. First, and most critical, he made no effort to check the electrical circuit he was going to use. He just plugged the computer into one wall outlet, and the terminal into another. Next, he had to connect the cable between the terminal and the computer. That's when his problems started. As soon as the cable connection was made between the terminal and the computer, there was an electrical explosion in both pieces of equipment—even though none of the switches was turned on.

Investigation revealed that one of the wall outlets had reversed polarity. In other words, the ground and hot circuits had reversed positions at the outlet. With any other electrical appliance, such as a radio, TV, fan, etc., the reversal would have had no adverse effect. However, with computers and peripherals with multiple electrical plugs that must be interconnected with exterior cables, correct electrical circuits are critical.

So, prior to use, all electrical circuits should be tested for a minimum of correct polarity. A simple three-light polarity tester is available at most Radio Shack stores for about $7. Even with reversed polarity, though, I believe that if all the equipment had used the same three-prong outlet, the equipment would not have been damaged.

Ernest R. Thomas
SANTA ROSA, CA

This Gem of Wisdom wins $25 for Ernest Thomas. If you have an anecdote, tip, or secret to share, send it (up to 250 words) to Gems of Wisdom Editor, Personal Computing, *50 Essex St., Rochelle Park, NJ 07662.*

LAW

outweigh the money to be gained by bringing suit, the manufacturer will probably drop the charges.

Penalties for infringement

The copyright owner is entitled to actual damages. In the case of a $200 computer program, it's difficult to specify what those damages would be. One form of damages might be the purchase price that wasn't received for the lost sales. But actual damages are complicated and difficult to show, so the 1976 Copyright Act also provides for so-called statutory damages that can be invoked instead. The statutory damages are not less than $250 and not more than $10,000 per infringement. The amounts vary with the number of works infinged upon, but not with the number of pirate copies generated at any one time.

In addition, the manufacturer can seek an injunction against the violator and impoundment of the infringing copies. Injunctions are typically what people use copyright law for, and they are a very powerful deterrent. If the case goes to trial, the lawsuit can run for years. Even before the case comes up, one alternative available to litigants is the temporary restraining order or preliminary injunction. The certificate of copyright registration is prima facie evidence of the rights assigned under the Copyright Act: "Here, your honor, I am the owner of the copyright of this particular work, and this guy's made copies of it. They weren't authorized copies. Make him stop." Often that is enough to get the copyright owner a preliminary injunction. If that preliminary injunction is granted, in most circumstances the case is over right there. Basically the defendant is out of business, with an enormous incentive to settle.

Finally, there are criminal penalties for copyright infringement. Fines of up to $10,000 or one year's imprisonment, or both, are possible punishments for willful infringement "for purposes of commercial advantage or private financial gain." Because it's such a headache to bring suit against individuals in the home or office, manufacturers try to discourage casual illegitimate copying by coding programs so as to make copying difficult (which has, by the way, given rise to a whole new industry of nibble copiers to defeat those codes). Manufacturers also structure their support to deny service to those with black market copies. Often the most important thing to a private user is his ongoing relationship with the manufacturer. He relies on this for updates, modifications, follow-on products, help with problems and questions, and essential long-term maintenance. If, for example, you try to call some software companies for help, the first thing they want to know before they talk to you is the serial number of your particular copy of the program. Sometimes this is honored more in the breach than in the observance, but the serialization process does give the manufacturer the power to exclude you from the support that is critical to you.

Rule of thumb

In general, if you make copies or modifications for archival purposes or for your own use alone, you're not violating copyright law, and you may not be violating a license. But once you hand a copy of either the unaltered or the modified work to someone else while retaining the original or a copy for yourself, chances are excellent that you have infringed on someone else's copyright.

If you have legal questions regarding personal computing and the law that you would like to see discussed in future columns, address them to:
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Sorry, we cannot personally answer or acknowledge questions.

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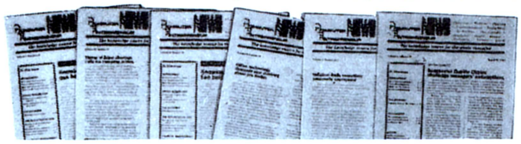

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CIRCLE 61

Introducing the portable computer for professionals on the move. Hewlett-Packard's new HP-75.

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Now we're introducing the HP-75 portable computer. And if press reaction is any indication, history is about to repeat itself.

As small as a book. As powerful as a personal.

Desktop-computer power in a handsome 26-ounce package. That's the HP-75. It's just 10 inches by 5 inches by 1¼ inches.

But don't let the compactness fool you. Inside its rugged case lies a 48K-byte, ROM-based operating system. With a comprehensive, 147-command instruction set that helps you write hard-working, memory-efficient BASIC programs.

Plug-in ROM ports let you add up to three 32K-byte software modules—modules that solve tough problems *without* sacrificing user memory.

And that user memory gives you up to 24K bytes of program and data storage.

It all adds up. A fully loaded HP-75 is a 168K-byte computing powerhouse in calculator clothing.

Want more? A built-in magnetic card reader provides a convenient, inexpensive way to store and retrieve programs or data.

The HP-75's typewriter-like keyboard means rapid, accurate entry of text or data. And when we say you can touch type on it, we *mean* you can touch type on it.

Those keys, by the way, can be redefined with your favorite commands or programs. Up to 196 unique key combinations in all.

Immediate, convenient access to your most frequently used programs.

Thanks to the HP-75's multiple-file structure, programs, data and text can be named, simultaneously stored in memory, and programmed to interact with each other.

Add continuous memory, and you've got a computer that's designed to solve problems on the go. Simply load your favorite files and enjoy immediate access to any or all of them. The files are retained in memory until *you* decide to delete them—even when the machine is turned off.

Time and appointments to keep you on schedule.

The TIME key brings to display the day of the week, date and time to the nearest second.

The APPOINTMENT feature reminds you—an hour from now or a year from now—of things you have to do. You can have a silent message on the display, any one of six alarms, or a combination of both.

Even if the machine is turned off, it will "wake up" and alert you of an appointment. Or it will execute programs or control peripherals according to predetermined schedules.

In an environmental test, for instance, where readings are taken every half hour, the HP-75 can make sure its owner gets the weekend off.

Software tailored to solve your specific problems.

HP-75 software is now available in areas such as math, engineering, finance, and statistics. With VisiCalc®* on the way.

Our plug-in math module,* for instance, solves polynomial roots, evaluates integrals, and performs finite Fourier transforms.

With our text-formatter module,** you'll compose memos, letters, and short documents virtually anywhere; then print them out when you return to your home or office.

In addition, our third-party software program assures you of ever-expanding software variety.

If you're a volume purchaser or OEM, give us a call. We can help you create custom HP-75 systems with special plug-in modules, magnetic cards, digital cassettes, and keyboard overlays.

Peripherals for a total computing package.

The HP-75 is equipped with the Hewlett-Packard Interface Loop, giving you a choice of 15 peripherals. (And that choice is expanding. The HP-75 *can* work simultaneously with up to 30.)

In a battery-powered briefcase system weighing about seven pounds, you might have the 24-character printer, digital cassette drive and acoustic modem.***

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In summary, the HP-75 is the heart of an extremely versatile system, in addition to its stand-alone capabilities.

Manuals to make sure you get the most from your machine.

Chock-full of examples and helpful hints, our owner's manual will get you up and running in short order. And it's organized to help you access the information you need to get on with the job at hand.

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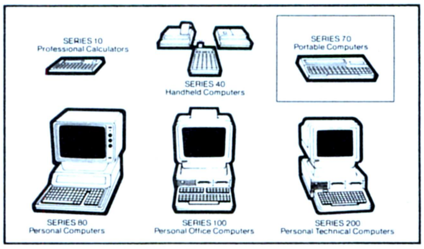

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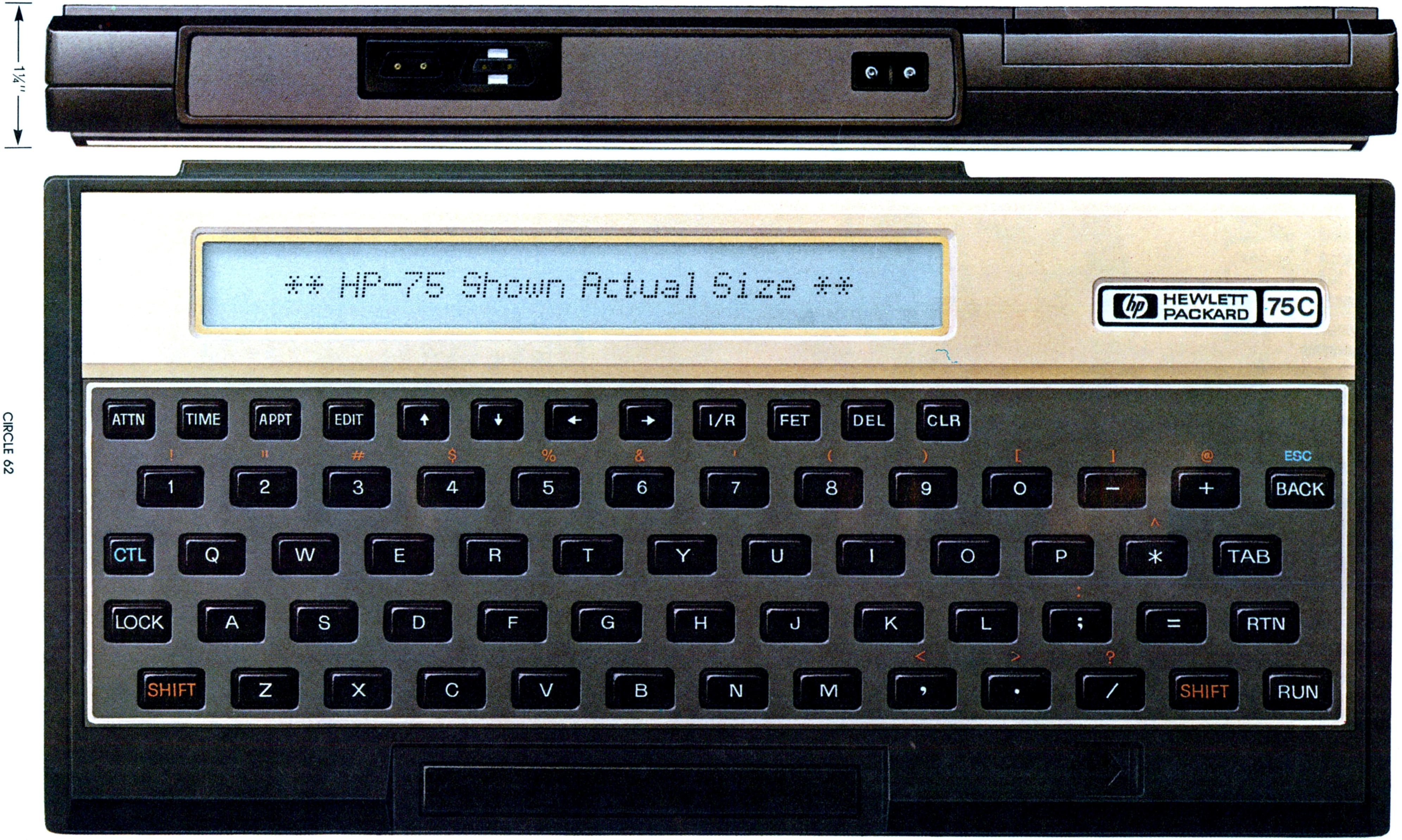
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HP-75 SPECIFICATIONS

Size and weight: 10″ X 5″ X 1¼,″ 26 oz.
48K-byte, ROM-based operating system:
• 8-bit CMOS CPU • Multiple file structure in continuous memory • Instruction set: 52 system commands, 43 BASIC commands, 41 numeric functions, 7 string functions, 6 time-mode commands, 16 arithmetic/logical/relational operators
Numeric precision:
• Real—12 digits (±9.99999999999 x $10^{\pm 499}$)
• Short—5 digits (±9.9999 x $10^{\pm 99}$)
• Integer—5 digits (±99999)
Time/appointments:
• Perpetual clock/calendar • 12- or 24-hour format • Appointment control of command/program execution
Memory:
• User (RAM)—16K bytes, expandable to 24K bytes • Operating system (ROM)—48K bytes
• Plug-in software (ROM)—up to 96K bytes (3 32K-byte modules)
Typewriter-like QWERTY keyboard:
• 65 keys • 194 redefinable key combinations
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Integral mass storage: hand-pulled card reader (1.3K bytes per card)
Built-in interface: HP-IL; choice of 15 peripherals
Power supply: 3 AA NiCad batteries (AC adapter/charger included)
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CIRCLE 62

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Videoplace: A Vision Of The Future

ARTIFICIAL REALITY
MYRON W. KRUEGER
ADDISON-WESLEY PUBLISHING CO.
READING, MA
312 pp., $10.95

Myron Krueger's *Artificial Reality,* a vision of the future, will intrigue readers interested in computer-controlled art forms and environments. Krueger, a professor of computer science at the University of Connecticut, has been experimenting with such environments for several years. His may well be a vision of the near future.

The book describes some of Krueger's work in this field, and offers a look at a time when art will join technology to produce a computer-assisted responsive environment promising psychological comfort, aesthetic pleasure, and improved communications. If this book is any sort of guide, this Brave New World could be a lot of fun.

Krueger, who moves easily between the world of computers and the works of artists such as composer John Cage and painter Jackson Pollack, has conceived a computer-controlled, shared visual environment called Videoplace. In its simplest form, Videoplace is a room where one wall is used for rear-screen video projection. When a participant walks into the room, his image is picked up by a TV camera, digitized, and processed by a computer that produces a life-size image on the video wall.

Two or more Videoplaces can also be linked, and composite images can be shown in both environments, allowing purely electronic meetings and activities to take place. Additional images can be added, so participants may appear to be climbing a mountain or swimming in the sea, for example. The possibilities are endless.

Krueger envisions even more complex Videoplaces with sensors to detect body movement and transducers to produce tactile sensations. Two people in different Videoplaces would not only see images of each other as though they were in the same place, but would also have the sensation of touch.

Unlike the telephone with its usually brief, voice-only contact, Videoplaces hold the promise of extended communication even when no words are spoken. Imagination is the only limit to the types of human communication that could be simulated in a responsive environment.

While Videoplaces have some obvious applications in work and education, Krueger also sees influence on traditional arts—dance, theater, poetry, writing, painting, and sculpture. Ideas such as kinetic poetry or the interactive novel may sound strange to our conventional ears, but Krueger bubbles with enthusiasm for these uses of his visions.

In the concluding chapter of this stimulating book, Krueger makes a passionate plea for support for the types of experiments he has been working on, and for progress in technology and science for human betterment. He sees change as a virtue and urges that the nation renew its commitment to progress. However, he's concerned with more than the purely practical. Krueger wants us to enjoy ourselves while we put the fruits of technology to work. A little whimsy is not a bad thing, he seems to say. Read *Artificial Reality* and enjoy it.
—*Jeffrey Bairstow*

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How to handle a sea of data

DATA BASE MANAGEMENT SYSTEMS
DAVID KRUGLINSKI
OSBORNE/MCGRAW-HILL
BERKELEY, CA
260 pp., $16.95

To many small businessmen, the phrase "data-base management system," or DBMS, conjures up images of huge corporations with volumes of records on customers, products, and employees. Yet small businesses frequently generate sufficient data to justify the use of the same computer techniques used by large corporations for data management. A simple list of customers can be manipulated and maintained with a DBMS that offers more than the basic mailing-list program. Note the word "manipulation." It is this ability to perform actions on data that distinguishes a DBMS from a simple record-keeping file manager.

The establishment and use of a DBMS is no simple matter, however. Setting up a computerized data base will often require a high degree of raw data organization. Considerable effort must be devoted to determining how the data are to be accessed. Interfaces with other programs such as accounting packages must be considered. In fact, expert assistance is often needed before a small business can set up and use a DBMS. Thus, David Kruglinski's book is a welcome addition to the personal-computer software bookshelf. Subtitled "A Guide to Microcomputer Software," the book looks at both data-base management systems and software packages.

This is not a book for the home-computer owner. Using a DBMS to keep your Christmas card list, for example, is rather like using a jackhammer to crack a peanut. There are easier ways. The data-base management systems described by Kruglinski are intended for serious business applications, just like the packages offered by IBM and DEC for their mainframe computers. Kruglinski's book is aimed at the small businessman who is already using a personal computer and is ready to tackle applications beyond routine accounting.

Kruglinski's book begins with a look at simple file-management systems (FMS), and proceeds to two main types of data-base management systems—relational, and network or hierarchical. In the relational system, data are stored as files that resemble the tables of a spreadsheet calculator. Relationships between the rows and columns can be modified with a kind of electronic "cut and paste" technique, and changes can be made in the data base with simple commands. In the network system, data are stored in a tree-like, hierarchical form. A data description language explains the structure of the data, and a data manipulation language allows the user to work with the data. This network system is more sophisticated and more difficult to use than the relational system, but Kruglinski carefully spells out the pros and cons of each type.

The book's three introductory chapters are must reading for the DBMS novice. The real meat of the book, however, is in the chapters that review four commercial software packages. Studying these sections is the next best thing to having hands-on experience with each of the four systems, a process to be encouraged before a purchase is made. Two of the systems mentioned—the Condor 20 from Condor Computer Corp., and dBASE II from Ashton-Tate—are relational. Another—FMS-80 from DJR Associates—is a file-management system. The fourth and most complex—the MDBS III from Micro Data Base Systems—is a true hierarchical system. These four data-base management systems run under

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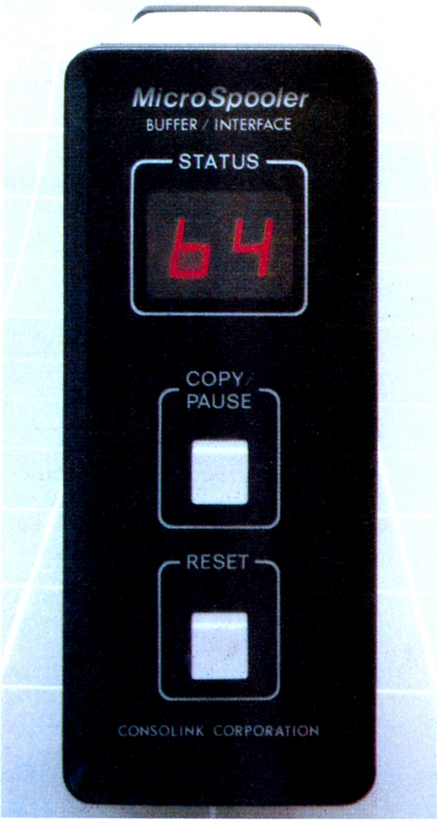

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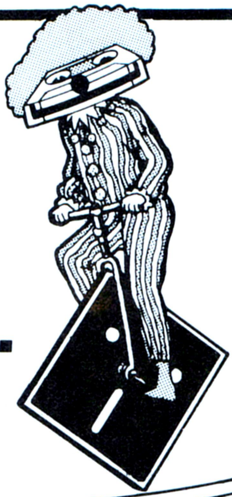

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CIRCLE 54

BOOK REVIEWS

CP/M, but versions are available for other machines such as the IBM Personal Computer.

The first two systems will be of most interest to personal-computer users, and Kruglinski's reviews of them are detailed and helpful. As the author admits, there are other useful DBMSs, such as those intended specifically for the Apple or TRS-80. A few of these are briefly described in a later chapter, but no mention is made of the products available from VisiCorp, which is an unfortunate omission. An additional chapter that reviews file-management systems would also be helpful to the personal-computer user.

—Jeffrey Bairstow

A tour of a spreadsheet

MASTERING VISICALC
DOUGLAS HERGERT
SYBEX, INC.
BERKELEY, CA
217 pp., $11.95

Someday—hopefully soon—computer manufacturers and software suppliers will realize they should be hiring people like Douglas Hergert to write their manuals. Until they do, they'll continue to support a whole industry that flourishes because some of the best machines and the most versatile software are accompanied by manuals written by and for programmers and engineers—which is to say, they are largely unintelligible to the rest of us. A company produces a terrific piece of software and, sooner or later, someone comes along to explain to the uninitiated how the software works and how to use it.

Douglas Hergert has done precisely that, and busy executives and entrepreneurs who can most benefit from using VisiCalc—but who have neither the time nor the inclination to plow through computerese—should be glad he did. (Perhaps we should mention, for newcomers, that VisiCalc is an electronic spreadsheet that has rapidly become the most popular "decision support system," especially among personal-computer users. Among its other wonders is its ability to reduce days of "what-if" calculations to a few strokes on a keyboard.)

To be sure, *Mastering VisiCalc* is intended for beginners. The author takes the reader through a brief, lucid, and surprisingly comprehensive tour of VisiCalc's capabilities, with special emphasis on home, office, and scientific applications. He then goes through a hands-on instructional that quickly gets the user into the program and establishes a rapport between novice and spreadsheet.

But even people who have worked with VisiCalc for a while can derive considerable benefit from *Mastering VisiCalc*. In gradual, easy stages, the book progresses to more advanced applications. Of particular value are the three chapters on Data Exchange Format (DEF) files—what they are, how to read them, and how to write them, using BASIC. (Essentially, they're the permanent files created by and with VisiCalc that the user wants to save, either for record purposes or for later referral.) The appendix on BASIC, while relatively brief, could stand alone as an introductory text or a refresher course. Another appendix discusses file-handling subroutines for the Apple, the TRS-80, and the IBM Personal Computer.

The book is well illustrated with charts and screen displays, as well as actual programs printed, refreshingly, so that the middle-age executive won't need a magnifying glass to read them.

If you already have VisiCalc, but haven't explored its full potential, pick up a copy of *Mastering VisiCalc* at the book store and leaf through it;

(continued on page 146)

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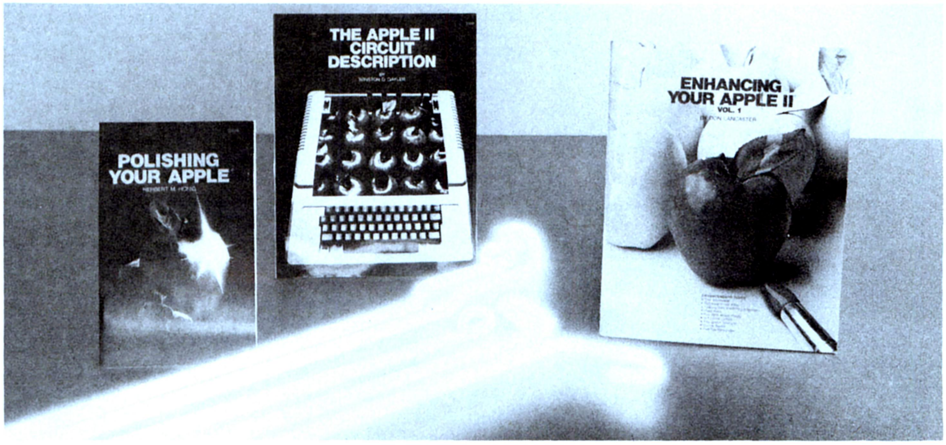
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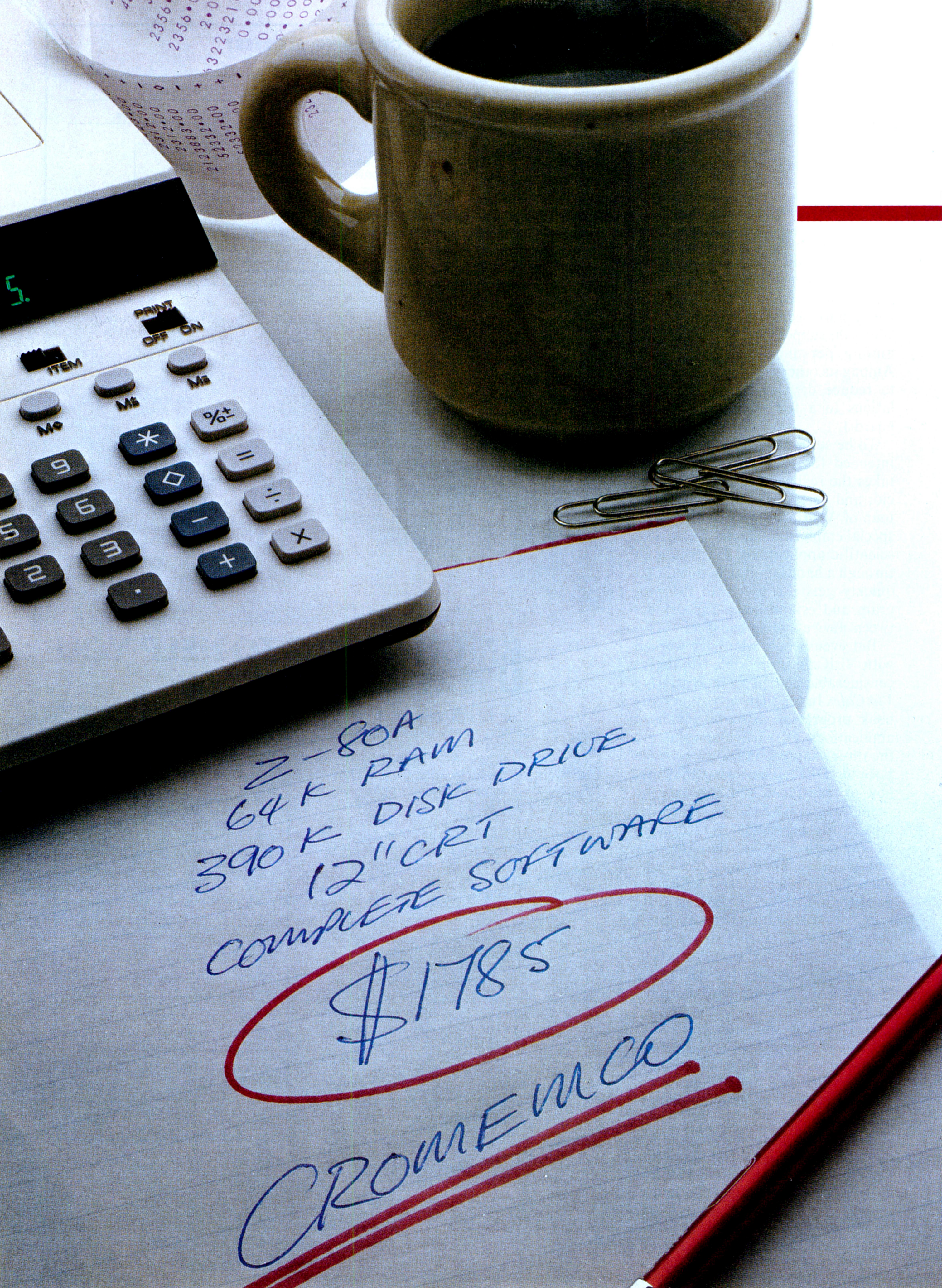
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BOOK REVIEWS

(continued from page 143)

it could be just what you're looking for. If you're planning to buy VisiCalc, buy a copy of this book at the same time. By all means, read through the manual that comes with the software. Then set it aside for reference, load the program into your computer, and let Hergert be your guide.

—*Marvin Grosswirth*

When documentation isn't enough

OSBORNE CP/M USER GUIDE
THOM HOGAN
OSBORNE/MCGRAW-HILL
BERKELEY, CA
286 pp., $15.95

Although CP/M has gone through several expansions, it is essentially the same system as the one developed in 1973 by Dr. Gary Kildall, who was, at that time, a software consultant for Intel, the microprocessor manufacturer. Intel declined to market the system, and this later led to the founding of Digital Research. Some estimates suggest that there are as many as a half-million CP/M users, and versions of the operating system are available for almost every personal computer in production today. So it comes as no surprise that Osborne has now published the second edition of Hogan's valuable user's guide.

While it is certainly true that the documentation offered with CP/M is extensive and often consists of six or more manuals, the CP/M novice will find the manuals tough going unless he is a relatively experienced programmer. Thus, a separate user's guide, such as Hogan's book, is a worthwhile purchase.

The book will also be of value to owners of computers not ordinarily sold with CP/M, such as the Apple II or the IBM Personal Computer.

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CIRCLE 137

With the addition of the Xedex Baby Blue card for the IBM, or the Microsoft Softcard for the Apple, the vast range of software that runs under CP/M comes into view. Hogan's book is an excellent introduction to CP/M that should be read before the purchase of add-on hardware and operating software.

In readable style, Hogan shows how the user can get started with CP/M, CP/M-80, and CP/M-86. He explains how to use both the built-in commands—those stored in memory when the operating system is booted—and the transient commands—those stored on disk and loaded into memory when called. A brief chapter also looks at assembly-language utilities, but this chapter will be of use only to experienced assembly-language programmers. An additional chapter is devoted to variations on CP/M such as MP/M and CP/NET.

—*Jeffrey Bairstow*

CP/M: For insiders only

MASTERING CP/M
ALAN R. MILLER
SYBEX, INC.
BERKELEY, CA
398 pp., $15.95 paperback

While I would wholeheartedly recommend the *Osborne CP/M User Guide* to almost any new or current CP/M user, *Mastering CP/M* is strictly for the advanced user or systems programmer with a good background in assembly language. The author recommends a few introductory books on CP/M and assembly-language programming as a prerequisite for understanding his book. He's right. It's a guide for those who want to understand the inner workings of CP/M.

Alan Miller, a professor at the New Mexico Institute of Technology,

COMING IN FUTURE ISSUES

Thinking Computers

As a researcher in artificial intelligence at Yale University, Natalie Dehn is trying to forecast the effects of the computer revolution on human thought processes. In an interview with *Personal Computing,* she discusses her work and offers her observations on how computers are changing the way people think.

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uses a tutorial style to cover procedures for altering the basic disk operating system (BDOS) and the basic input-output system (BIOS). He explains in some detail how to build a macro library and how to examine the CP/M disk directory. The book is full of assembly-language routines, and appendices detail the 8080 and Z80 microprocessor instruction sets.

—*Jeffrey Bairstow*

Facing up to interfacing

HARDWARE INTERFACING WITH THE TRS-80
JOHN E. UFFENBECK
PRENTICE-HALL, INC.
ENGLEWOOD CLIFFS, NJ
231 pp., $19.95 hardbound;
$13.95 paperback

The third sentence in *Hardware Interfacing with the TRS-80* reads: "Each experiment [in this book] is intended to be built on a breadboard and not constructed as a permanent circuit." In other words, John Uffenbeck issues an open invitation to would-be tinkerers with a propensity toward klutziness to dive in. Whatever calamities and disasters may occur during the experiments, at least the computer is likely to remain unharmed.

The book, however, is probably best suited for people who enjoy tinkering for its own sake, or who want certain peripherals but can't justify the expenditures for plug-it-in-and-watch-it-run hardware.

Among the 14 "practical hardware experiments" in this book are those that enable the experimenter to hook up a modem, a printer, a digital-to-analog converter and vice versa, a programmable sound generator, and a variety of other devices that Uffenbeck views with suspicion.

"Much of the outside world," he

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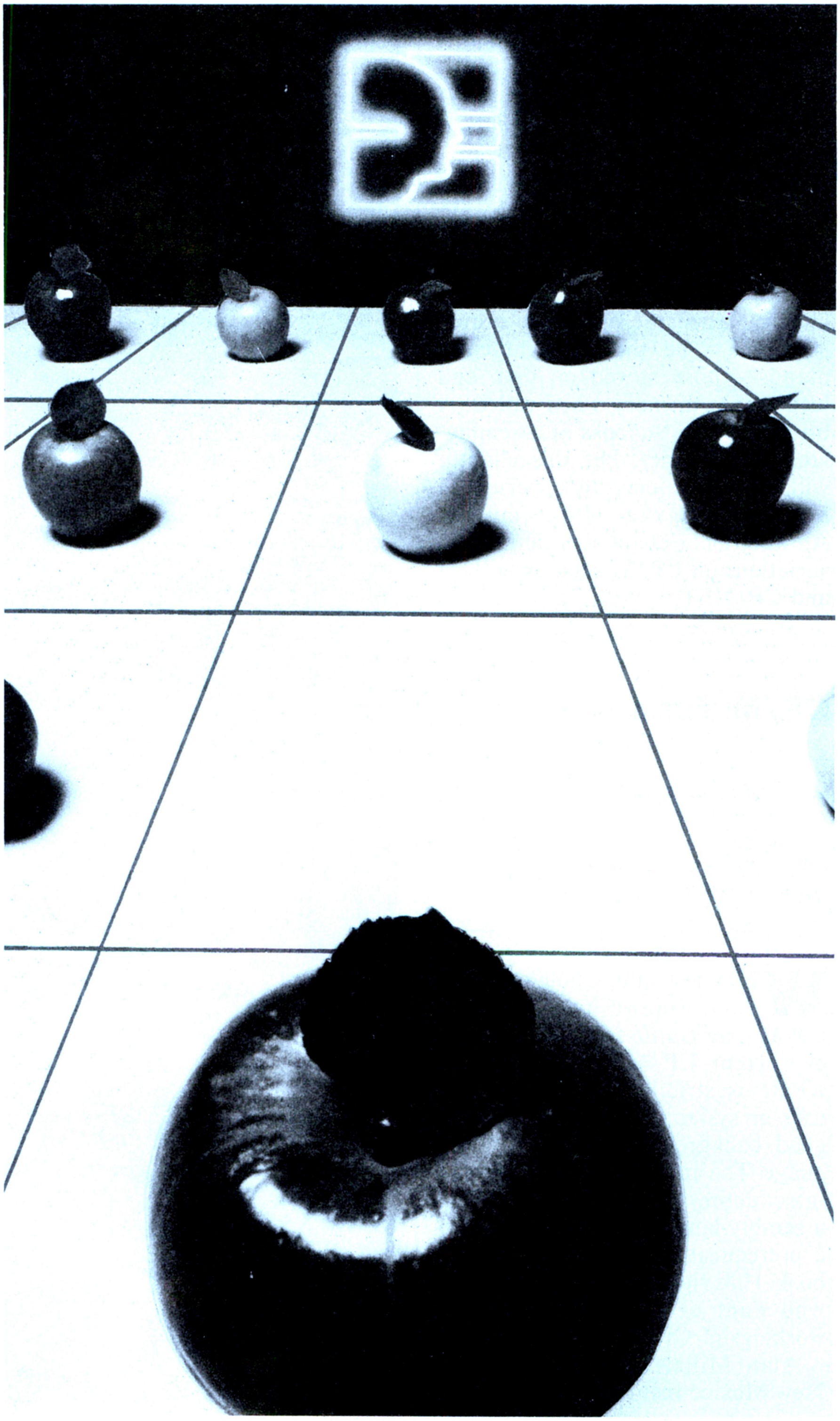
Computer Typesetting By Telephone

Businesses can cut typesetting costs by transmitting material directly to the typesetter through a word processor and telephone modem. This method can reduce input costs and turnaround time while still providing the benefits of professional typesetting and printing. Read how to set up such a system in the June issue of *Personal Computing*.



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Buyer's Guide To Computer Furniture

As technological advances bring us more sophisticated computers, computer furniture manufacturers are responding with innovative, ergonomically designed furniture to support and enhance the new hardware. For a full report on computer furniture, see the special Buyer's Guide in the September issue of *Personal Computing.*

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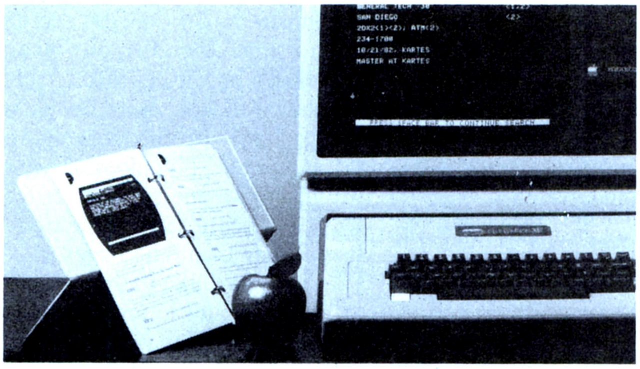

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CIRCLE 70

writes, "presents a 'hostile' environment to the TRS-80 . . ." That hostility, apparently, can be tamed with experiments aimed at controlling 110-volt AC devices, and devices that require "handshaking" procedures.

It would appear that as technically oriented works go, this is not a particularly difficult book to comprehend. It is not, however, for the frivolous. Nor is it for those given to emotionalism. "It is surprising," writes Uffenbeck, "how many of yesterday's problems can be solved the next morning in five minutes with a cool head. When you find yourself getting agitated, take a break. Come back to the circuit later. More often than not, you will fix your problem in a few minutes."

—*Marvin Grosswirth*

But is it art?

COMPUTER ART AND ANIMATION FOR THE TRS-80
DAVID L. HEISERMAN
PRENTICE-HALL, INC.
ENGLEWOOD CLIFFS, NJ
246 pp., $12.95 paperback;
$17.95 hardbound

"Viewed objectively," David Heiserman tells us, "a TRS-80 image of a girl standing in the middle of the screen can look terrible. However, if you take time and care in preparing the figure . . . the brain will attempt to interpret the image as something rather nice and meaningful . . . . Furthermore, the effect is enhanced when the image is animated in real time."

Well, I certainly hope so.

The rather skimpy illustrations of the actual results of programming for "art" and animation that appear in this book are not terribly impressive. Perhaps the problem is in the book's title. Computer art conjures up lush images of intertwining swirls and loops and peaks, of fanciful forests, of

COMING IN FUTURE ISSUES

Can Two Computers Live As Cheaply As One?

As members of the family compete for time on the home computer, many people are considering buying a second computer for home use. What should you look for in a second computer? Can two computers share peripherals? Software? Find out in the July issue of *Personal Computing*.

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CIRCLE 73

BOOK REVIEWS

bagel shapes that glow—an orgy of plane and solid geometry. What we have here are a lot of nice arrangements of rectangles.

If this book were entitled "Computer Graphics and Animation with the TRS-80," it would not only be closer to the mark, but would fulfill the promise inherent in any book title.

As might be expected, the book begins with simple figures and winds up with more complex designs performing animated actions. Complete instructions on how to program are accompanied by sample programs that, presumably, produce the desired results. (They were not actually tested by me.)

Particularly interesting are the instructions on how to create unusual alphanumerics, which the author demonstrates with an eye-catching Cyrillic-alphabet set. (Whether "eye-catching" is synonymous with "attractive" is a matter of taste. I like it, but who knows what the Russians think of it?) You can do a CRT version of dropouts (white letters on a black background), letters of varying sizes, and whatever else your imagination conjures up.

As for the animation, if the figures are less than "art," they are certainly fun to do. In the first section on animation, the diligent programmer learns how to create a robot figure that walks, turns, raises its arm, turns its back to the screen and walks away, etc. Nor does the author suggest that one should settle for that: ". . . create some animated scenarios of your own," he urges.

If you'd like to draw some passable pictures and letters on your TRS-80, and have them move about, this book will show you how to accomplish that and how to invent your own graphics and animation sequences. They should look quite good. They should also provide an effective prod for your own creativity.

But is it art?

—*Marvin Grosswirth*

Can a computer purchase be this difficult?

SO YOU THINK YOU NEED YOUR OWN BUSINESS COMPUTER
WILLIAM E. PERRY
JOHN WILEY & SONS, INC.
NEW YORK, NY
201 pp., $14.95

After reading this book, you'll probably come to the conclusion that the last thing your business needs is a personal computer. If buying a computer were as difficult as this book suggests, most small businessmen would never get to the buying stage. William Perry, a computer consultant, seems to be making a strong case for hiring consultants to examine businesses and make recommendations on computer applications. Perry may be entitled to publicize his services, but I don't see why anyone should pay $14.95 to read his advertisement.

Perry is thorough, however. His book is full of worksheets, some of which have 40 or 50 items that need to be filled out. He then directs the reader to several step-by-step procedures and a variety of not so trivial tasks. It's enough to bring an already overworked small businessman to his knees. I realize that a $6000 investment is not to be considered lightly by anyone, but is $12,000 worth of effort really necessary before making that investment?

Fortunately, there are little gems scattered throughout the book that may make the completion of the those worksheets superfluous. Called "Rules of Thumb" by the author, these platitudes may tell businessmen all they need to know.

Few small businessmen will have the resources to tackle the planning indicated in Perry's book. Fewer small businessmen will have the time needed to read this book.

—Jeffrey Bairstow

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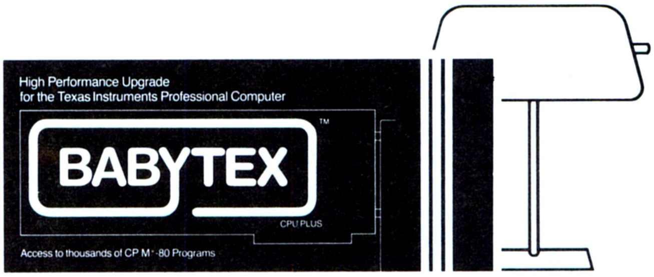
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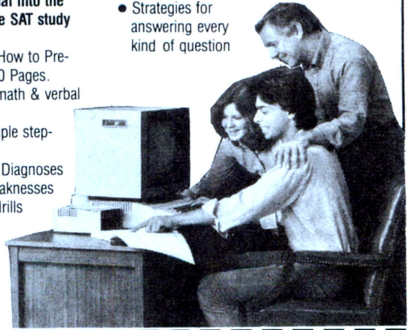

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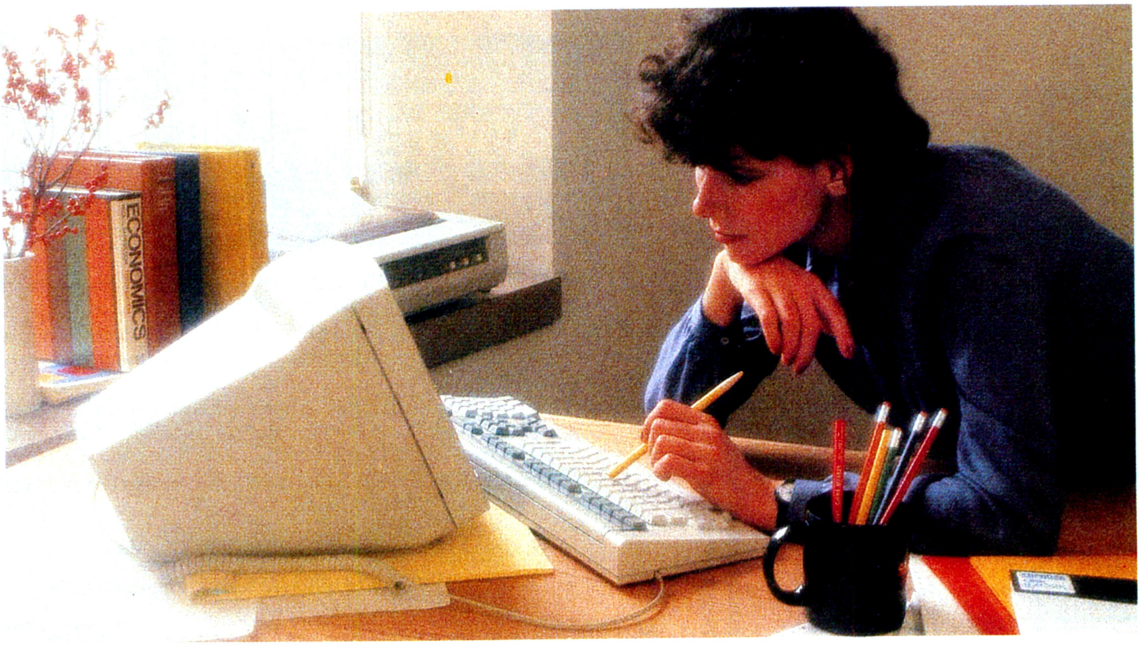

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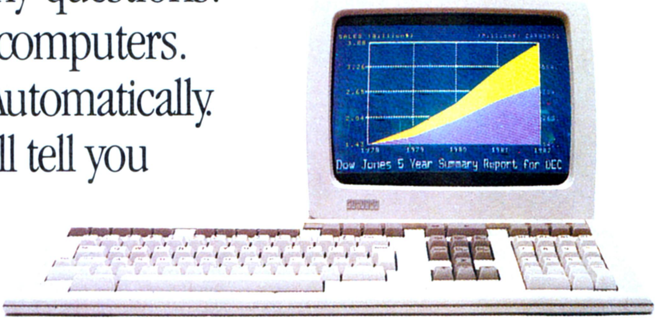

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Printers	(415) 327-6500
Robotek/El Cerrito	(415) 524-3730
Skyles Electric Works/Mountain View	(415) 965-1735
Softwaire Centre International/Concord	(415) 674-0222
Software Emporium/Los Altos	(415) 941-8788
Sorbus Station/San Leandro	(415) 483-9862
The Software Shop/Burlingame	(415) 340-7115
Stacey's Bookstore/San Francisco	(415) 326-0681
Sunset Computers/San Francisco	(415) 665-7378
Technika Berkeley	(415) 524-8934
The Xerox Store/Concord	(415) 680-1600
The Xerox Store/Palo Alto	(415) 324-8200
Palomar Computer Products/San Marcos	(619) 744-7314
Softwaire Centre/La Mesa	(619) 462-3900
Computer Scene	(707) 462-1578
Santa Rosa Computer Ctr.	(707) 528-6480
Zackit Vallejo	(707) 644-6676
Advanced Computer Prods./Santa Ana	(714) 558-8813
Byte Shop/San Diego	(714) 565-8008
Capistrano Computers	(714) 661-7250
Computer Age/San Diego	(714) 565-4042
Computer Merchant/San Diego	(714) 583-3963
Computer Metrics/El Cajon	(714) 579-8066
Computer Nook, Inc./San Bernadino	(714) 381-3446
Computerland	(714) 464-5656
Computerland	(714) 560-9912
Computerland/Laguna Hills	(714) 859-8912
Computerland/North	(714) 434-3300
Computerland/San Bernadino	(714) 886-6838
Computerland/W. Los Angeles	(714) 560-9912
Computerland/Riverside	(714) 686-3470
Computers Unlimited/Dana Point	(714) 661-8062
Computer Wave Inc./Westminster	(714) 891-2584
Consumer Computers	(714) 465-8888
CTC—The Computer People	(714) 565-0505
HBJ Bookstore/San Diego	(714) 238-1255
Heathkit Electro Center	(714) 776-9420
Idea Computers	T o Come
Integrated Circuits Unltd./San Diego	(714) 278-4393
James Games Computer Center	(714) 985-3278
May Company/Costa Mesa	(714) 546-9321
Net Profit Computers/Anaheim	(714) 750-7318
Powers Computer Center/Anaheim	(714) 778-6021
Practical Computing/Encinitas	(714) 436-3512
Softwaire Centre Int'l/El Toro	(714) 642-6836
Softwaire Centre Int'l./Brea	To Come
Softwaire Centre Int'l./Huntington Beach	(714) 842-1990
Softwaire Centre International/San Diego	(714) 576-1424
Software Center/Santa Ana	(714) 641-0332
Sorbus Station/Anaheim	(714) 549-8505
The Computer Merchant/Escondido	(714) 583-3963
The Wabash Apple/El Toro	(714) 768-3236
The Xerox Store/Brea	(714) 671-0794
The Xerox Store/Costa Mesa	(714) 646-8941
The Xerox Store/Costa Mesa	(714) 641-9099
The Xerox Store/Huntington Beach	(714) 898-8066
The Xerox Store/Riverside	(714) 687-2580
The Xerox Store/San Bernadino	(714) 889-9511
The Xerox Store/Long Beach	To Come
VIP Computer Centers/Irvine	(714) 551-5622
Byte Shop/Ventura	(805) 647-8945
Charlie Apple Software/Ventura	(805) 644-0799
Compusup/Lancaster	(805) 942-5747
Computer Horizons/Camarillo	(805) 987-4330
Computer Plaza/Santa Barbara	(805) 687-9391
Computer Shop	(805) 963-1325
Computer Solutions/Santa Monica	(805) 922-6639
Computer Sound/Lancaster	(805) 945-5921
Computerland/San Luis Obispo	(805) 541-4884
Computerland Santa Clarita/Newhall	(805) 254-3121
Computerland of Santa Barbara	(805) 967-0413
Computerland/Thousand Oaks	(805) 495-3554
Computerland Ventura	(805) 396-8084
QPSB Personal Electr./Goleta	(805) 967-7100
Ventura County Computer Center	(805) 648-5059
Byte Shop/Sacramento	(916) 961-2983
Capitol Computer/Sacramento	(916) 483-4729
Computer Place/Redding	(916) 221-1312
Computerland/Redding	(916) 241-7922
Computerland/Sacramento	(916) 920-8981
Computertime/Citrus Heights	(916) 969-4111
House of Computers/Sacramento	(916) 971-9642
Softwaire Centre Int'l/Sacramento	(916) 925-3337
Student Bookstore/Cal State U.	(916) 895-6044

COLORADO

1 Stop Software Stores/Arvada	(303) 431-6598
Aparat/Denver	(303) 741-1778
Computer Connection/Englewood	(303) 740-9360
Computer Connection/Boulder	(303) 449-8282
Computer Shack/Pueblo	(303) 564-3545
Computerland/Durango	(303) 385-4848
Computers, Inc./Englewood	(303) 779-5256
The Xerox Store/Aurora	(303) 695-8660
The Xerox Store/Denver	(303) 825-2386
The Xerox Store/Denver	(303) 692-0414
Whole Life Distributor/Denver	(303) 861-2825

CONNECTICUT

Aetna Life Club Store/Hartford	(203) 273-3058
Anchor Microsystems/Westport	(203) 222-1259
Bright Ideas/Gilford	(203) 453-6665
Business Machine Center/Middletown	(203-632-1939
Computer Ease/Milford	(203) 877-7447
Computer Services/Danbury	(203) 743-1299
Computer Store	(203) 563-9000
Computer Store	(203) 627-0188
Computerland	(203) 235-9204
Computerland/New Haven	(203) 273-4807
"80" Plus Microcomputers/Seymour	(203) 888-0170
Exel Sys./Stamford	(203) 348-5894
Harold's Drugs/Bristol	(203) 583-1854
Hatry Electrs/New Haven	(203) 787-5921
Heathkit Electronics/Avon	(203) 678-0323
Logical Systems Inc./Farmington	(203) 677-4557
Micro Age Computer Store/Greenwich	(203) 629-8171
Micro Computer Store/Norwalk	(203) 847-8428
Paperback Booksmith/E. Hartford	(203) 568-2228
Rainbow Computer, Inc./New Haven	(203) 777-2001
Southern New England Electronics/ E. Windsor	(203) 623-7635
Technology Sys./Bethel	(203) 748-6856
The Computer Establishment/ Old Saybrook	(203) 767-8520
The Xerox Store/Hartford	(203) 233-9871
Total Computers, Inc./Meriden	(203) 634-0052
Yale Co-op/New Haven	(203) 772-2200

DELAWARE

Computerland/New Castle/Newark	(302) 738-9656
Computer Store/Wilmington	(302) 478-7772
Micro Products/Wilmington	(302) 762-0227
The Smoke Shop/Wilmington	(302) 655-2861

DISTRICT OF COLUMBIA

Computer Store	(202) 272-0294
Pentagon Book Stores	(202) 695-0870
Program Store	(202) 337-4693
Students Book Co.	(202) 223-3327

FLORIDA

Evans Business Computer Sys	(209) 576-0451
Advantage With Computers/W. Palm Beach	(305) 471-1753
A I Personal Computer/Longwood	(305) 339-8914
Allstate Business Center Ltd./Miami	(305) 665-1013
Byte Shop of Miami	(305) 264-2983
Clarks Out of Town News/Ft. Lauderdale	(305) 467-1543
Computer Design/Hollywood	(305) 983-2300
Computer Generation/Plantation	(305) 791-4578
Computer Scene/Miami	(305) 945-1014
Computer Scene/N. Miami Beach	(305) 238-7238
Computerland/Altamonte Springs	(305) 862-6202
Computerland/Boca Raton	(305) 368-1122
Computerland/W. Palm Beach	(305) 684-3338
Computerland of Jacksonville at Regency Ct.	(305) 368-1122
Electronic Equipment Co./Miami	(305) 871-3500
Get Computerized Inc./Titusville	(305) 268-4007
H.I.S. Computermation/Melbourne	(305) 254-9399
Independent Computer Systems/ Winter Park	(305) 629-4771
Lighthouse Book Store/Lighthouse Pt.	(305) 781-1945
Micro Age Computer Store/W. Palm Beach	(305) 683-5779
Programs Unlimited/W. Palm Beach	(305) 689-1200
Software Centrum/Coral Gables	(305) 441-2983
Sunnys At Sunset, Inc./Sunrise	(305) 741-2070
The Xerox Store/Altamonte Springs	(305) 831-3100
The Xerox Store/Ft. Lauderdale	(305) 524-4663
The Xerox Store/Miami	(305) 667-5441
The Xerox Store/N. Miami Beach	(305) 947-9346
The Xerox Store/Orlando	(305) 898-5000
Extra Extra Newstand/Tampa	(813) 886-1802
Micro Computer System Inc.	(813) 879-4301
The Xerox Store/Clearwater	(813) 796-7507
The Xerox Store/Tampa	(813) 977-8301
The Xerox Store/Tampa	(813) 876-7439
Computer Sys. Resource	(904) 376-4276
Computerland/Jacksonville	(904) 731-2471
Computerland/Tallahassee	(904) 224-9341
Florida Book Store/Gainesville	(904) 376-6066
Goerings Book Ctr./Gainesville	(904) 378-0363
Grice Electrs. Inc./Pensacola	(904) 477-8100
Gulf Coast Computer Exchange/ Panama City	(904) 785-6441
Vitech/Tallahassee	(904) 893-1743
Software Source, Inc./Tampa	To come

GEORGIA

AIS Computer Store/Fayetteville	(404) 461-3881
Atlanta Computer Mart/Atlanta	(404) 455-0647
Atlanta Micro	(404) 233-6942
Baileys Computer Shop	(404) 790-5771
Computers Plus Inc./Atlanta	(404) 237-7787
Computerland/Atlanta/Smyrna	(404) 953-0406
Guild News Agency/Atlanta	(404) 252-4166
Micro-Graphics Systems, Inc./Augusta	(404) 790-5771
Peachtree Computer Center/Atlanta	(404) 522-0082
Programs Unlimited/Atlanta	To come
Software Atlanta Ltd./Atlanta	(404) 434-4171
Sorbus Station/Doraville	(404) 458-0620
The Xerox Store/Atlanta	(404) 938-1276
The Xerox Store/Atlanta	(404) 233-9025
Electronics 21 Inc./Savannah	(912) 352-0585
Ocean Software/Jesup	(912) 427-4278

HAWAII	
Amtec Inc./Honolulu	(808) 955-7429
Computer Center/Pearl City	(808) 448-2171
Computerland/Hawaii/Honolulu	(808) 521-8002
The Computer Store/Hilo	(808) 969-1166
IDAHO	
Electronic Specialties/Boise	(208) 376-5040
Magnum Computer/Boise	(208) 342-7304
ILLINOIS	
Computerland/Champaign	(217) 359-0895
Computerland of Springfield	(217) 522-3791
Main Street Computer Company/ Mattoon	(217) 234-4404
Programs Unlimited/Schaumberg	To come
Computer-Ease/Macomb	(309) 833-3886
Computerland/McLean County	(309) 663-9571
Computer Terminal/Peoria	(309) 692-9100
TZ Computers/Bloomington	(309) 829-6806
Wallace Micro-Mart Inc./Peoria	(309) 685-7876
ABC Byte Shop/Skokie	(312) 673-3550
ABC Data Processing Corp/Oak Brook	(312) 986-5558
Book Market/Chicago	(312) 440-4475
Chigaco Downtown Computerland	(312) 782-7180
Complete Computing/Lombard	(312) 620-0808
Compushop/Rolling Meadows	(312) 593-1800
Computer Emporium/Naperville	(312) 369-3711
Computer Plus/Northridge	(312) 452-0066
Computer Store/La Grange	(312) 352-9488
The Computer Store/Oaklawn	(312) 499-1300
The Computer Store/Woodridge	(312) 985-8610
Computerland/Naperville	(312) 369-3511
Computerland/Niles	(312) 967-1714
Computerland/Northbrook	(312) 272-4703
Computerland/Oak Lawn	(312) 422-8080
Computerland/Oak Park	(312) 383-1606
Computerland/Schaumburg	(312) 253-3009
Computerland of St. Charles	(312) 377-7200
Data Domain/Schaumburg	(312) 397-8700
Erickson Communication/Chicago	(312) 631-5181
Future Computer Ltd./Forest Park	(312) 771-5850
Illini Microcomputer/Naperville	(312) 420-8813
Kroch's & Brentano's/All stores	(312) 332-7500
Micro Computer Ctr./Geneva	(312) 232-1545
Nabih's Inc./Evanston	(312) 869-6140
Northbrook Computers	(312) 480-9190
Oak Brook Computer Ctr.	(312) 941-9005
Page One/Roselle	(312) 529-9060
Prairie News Agency/Chicago	(312) 384-5350
Programs Unlimited/Schaumberg	(312) To Come
The Software Store/Glenview	(312) 724-7730
The Software Emporium, Ltd./Chicago	(312) To come
Sorbus Station/Bensonville	(312) 459-8560
Wine Micro Computers	(312) 420-8813
Univ. Bookstore/Carbondale	(618) 536-3321
Appletree Computer/DeKalb	(815) 758-8666
Computerland/Joliet	(815) 741-3303
Computerland/Mundelein	(815) 459-3892
Computer Store/Rockford	(815) 962-7580
Ideal Computer Systems/Kankakee	(815) 935-8505
INDIANA	
Computer Corner/Ft Wayne	(219) 749-8338
Computer Plus/Dyer	(219) 865-3930
Computerland/Ft. Wayne	(219) 483-8107
Computerland/Mirabel	(219) 769-8020
Computerland/Mishawaka	(219) 256-5688
Data Base/Ft. Wayne	(219) 484-3164
Fourway Computer Products/South Bend	(219) 277-7720
A Computer Store/Indianapolis	(317) 898-0331
Computer 1/Indianapolis	(317) 257-3336
Computercraft/Carmel	(317) 846-5996
Computerland/Anderson	(317) 649-1122
Computerland/Indianapolis	(317) 849-8811
Graham Electrs./Indianapolis	(317) 634-8202
The Software Exchange/Indianapolis	(317) 251-7786
Von's Bookshop/W. Lafayette	(317) 743-1915
Book Corner/Bloomington	(812) 339-1522
The Computer Store of Jasper	(812) 482-9515
Custom Software/Terre Haute	(812) 234-3242
Data Domain/Bloomington	(812) 334-3607
Hoosier Electrs./Terre Haute	(812) 232-8508
KOE Computers./Div. Knapp/ Terre Haute	(812) 232-4361
Paris Office Systems/New Albany	(812) 944-7827
IOWA	
Computer Country, Inc./Marion	(319) 377-9437
Memory Bank/Bettendorf	(319) 386-3330
The Computer Ark/Decorah	(319) 382-8784
Computerland/Des Moines	(515) 270-8400
Omni Computer Center/Des Moines	(515) 276-8858
KANSAS	
Amateur Radio Equip./Wichita	(316) 264-9166
Computer Associates, Inc./Coffeyville	(316) 251-1800
Computerland/Hutchinson	(316) 662-6832
Computerland/Leawood	(913) 341-5335
Computerland/Wichita	(316) 684-3870
High Technology/Wichita	(316) 262-0315
Wichita Software Center/Wichita	(800) 835-1164
Book Shop/Manhatten	(913) 537-8025
Bronco Computer/Mankato	(913) 378-3117
Commonwealth Computers, Inc./ Overland Park	(913) 648-8086
Computerland	(913) 492-8882
Computerland/Lawrence	(913) 841-8611
Computerland/Topeka	(913) 267-6530
Kansas Micro Computer/Lawrence	(913) 841-6348
Online Computer Centers/Overland Pk.	(913) 341-6651
Personal Computer Ctr./Overland Pk.	(913) 649-5942
The Computer Room/Beatty	(913) 341-3500
Amerisource Computer Store/Prairie Village	To Come

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CIRCLE 68

PERSONAL COMPUTING DEALERS

KENTUCKY	
Computerland of Bowling Green	(502) 781-9990
Heathkit Electr./Louisville	(502) 245-7811
Stereo Stable's Computer Stall/Owensboro	(502) 685-6016
Computer World/Ashland	(606) 329-0545
MicroAge Computer Store/Lexington	(606) 278-0304
LOUISIANA	
Computers For All Inc./New Iberia	(318) 365-9507
Computer Shoppe Inc./Metairie	(504) 454-6600
Computer Terminal/New Orleans	(504) 891-0007
MAINE	
Coastal Computer Center/Brunswick	(207) 729-0298
MARYLAND	
Balance Corp. Center Inc./Baltimore	(301) 625-1100
Benchmark Computer Center, Inc. Towson	(301) 838-4320
Chafitz/Rockville	(301) 340-3300
Clinton Computer/Clinton	(301) 868-0002
Computer Strategies Inc./Gaithersburg	(301) 840-2173
Computer Unlimited/Towson	(301) 321-1553
Computers Etc./Annapolis	(301) 268-5801
Computerland	(301) 340-8484
Computerland/Towson	(301) 337-5555
Fredericks Computer Products/Frederick	(301) 684-8884
Heathkit Electrs.	(301) 881-5420
Komar Ltd./Baltimore	(301) 675-2200
Logical Choice/Ellicott City	(301) 465-3175
Program Store/Baltimore	(301) 944-0200
Tri-State Computers/Salisbury	(301) 742-2020
The Book Centers/Cumberland	(301) 722-8344
The Comm. Center/Laurel	(301) 782-0600
The Xerox Store/Rockville	(301) 424-1450
MASSACHUSETTS	
Computer Source/Pittsfield	(413) 443-7181
Retail Computer Ctr./Ludlow	(413) 589-0106
Aero Computer/Worcester	(617) 755-4775
Computer Store/Sudbury	(617) 232-5470
Computer Store/Cambridge	(617) 354-4599
Computerland/Boston/Wellesley	(617) 235-6652
Computerland of Boston/Woburn	(617) 938-1080
Computerland/Boston	(617) 482-6033
Computerland of Boston/Reading	(617) 942-0707
Eden Microcomputers/Osterville	(617) 428-3515
The Game Shop/Acton	(617) 263-0418
Harvest Computer/Cambridge	(617) 547-3289
Heathkit Electrs./Wellesley	(617) 237-1510
Microcon Software Ctr./Watertown	(617) 924-3333
The Micro Store/Taunton	(617) 823-8106
New England Electronics CO/Needham	(617) 449-1765
Ni-Ni's Corner, Inc./Cambridge	(617) 547-3558
Out of Town News/Cambridge	(617) 354-7777
Palace Spa/Brighton	(617) 783-5858
The Program Store/Cambridge	(617) 491-6690
Retail Computer Ctr/Ludlow	(617) 935-8060
Small Business Group/Westford	(617) 692-3800
Softwaire centre International/Lowell	(617) 459-7311
Video Station/Woburn	(617) 933-1445
YDI Electrs./Needham	(617) 449-1005
The Xerox Store/Boston	(617) 451-5800
The Xerox Store/Burlington	(617) 273-5665
The Xerox Store/Chestnut Hill	(617) 566-1707
MICHIGAN	
Allen Park Computer Center/Allen Park	(313) 383-8254
Binary Corp/Berkley	(313) 548-0533
Computer Connection/Farmington Hills	(313) 447-4470
Computer Contact, Inc./Grand Blanc	(313) 694-3740
Computer Corner/Lapeer	(313) 664-6434
Computer Horizons/Livonia	(313) 464-6502
Computer Mart/Flint	(313) 234-0161
The Computer Shoppe/Flint	(313) 238-1000
Computerland/Ann Arbor	(313) 973-7075
Computerland/Southfield	(313) 356-8111
Computerland/St. Clair Shores	(313) 772-6540
Condor Business System Center/Ann Arbor	(313) 769-3988
The Family Computer Center/Berkley	(313) 546-8114
Front Page Bookstore/Pontiac	(313) 332-3431
I Browse Books/W. Bloomfield	(313) 855-9353
Infosource/Southfield	(313) 353-0660
Heathkit Electr. Ctr./Detroit	(313) 535-6480
Maple Office Supplies/Southfield	(313) 559-8811
Matrix Computer Center/Dearborn	(313) 274-0600
Micro Station Inc./Southfield	(313) 358-5820
New Horizons Book Shop/Roseville	(313) 296-1560
Rainbow Computers/Troy	(313) 528-3535
Rochester Book Center	(313) 651-0199
Simtec/Birmingham	(313) 855-3990
Spectrum Computers/Lathrup Village	(313) 559-5252
Very Small Business Computers/Warren	(313) 573-7260
Community Newscenter	(517) 349-3510
The Computer Haus/Gaylord	(517) 732-6544
Computer Mart/Lansing	(517) 351-1777
Comtec/Owosso	(517) 725-7326
ComputerKing/Edina	(612) 920-1154
Compuduct/Grand Rapids	(616) 949-0281
Computer Mart/Kalamazoo	(616) 329-1000
Computerland/Grand Rapids	(616) 942-2931
Computers & More/Grand Rapids	(616) 243-3525
Doc's Other Computer Store/Muskegon	(616) 755-3906
Heath Computer Store/St. Joseph	(616) 982-3215
Professional Computer System/St. Joseph	(616) 429-9616
The Computer Room/Kalamazoo	(616) 343-4634
MINNESOTA	
Granada News/Duluth	(218) 727-9122
Rolandson Computer Ctr./Fergus Falls	(218) 736-5925
Readmore Book & Card/Mankato	(507) 345-5704
Bit by Bit Computer Resource Ctr./St. Paul	(612) 646-4833
CB Lektronix/South St. Paul	(612) 455-2458
Computer Depot/Bloomington	(612) 375-2008
Computer Professionals/Burnsville	(612) 435-8060
Computerland	(612) 559-1984
Computerland/Bloomington	(612) 933-8841
Digital Den/St. Paul	(612) 699-8442
Heathkit Ctr./Hopkins	(612) 938-6371
Minnesota Book Center/Minneapolis	(612) 373-5734
Online Computer Ctrs./Minneapolis	(612) 546-8814
Personal Business Systems/Minneapolis	(612) 929-4120
Readmore Bookstore/Minneapolis	(612) 333-3628
Schinders's Hennepin News/Minneapolis	(612) 333-6942
The Software Centre/Bloomington	(612) 881-4514
Weldon Electrs./Plymouth	(612) 559-1984
The Xerox Store/Edina	(612) 929-4334
The Xerox Store/Minneapolis	(612) 332-6866
The Xerox Store/St. Paul	(612) 227-3366
MISSISSIPPI	
The Book Store/Greenville	(601) 332-2665
Computer World/Hattiesburg	(601) 544-3135
Computerland/Jackson	(601) 362-8755
Computerland/Washington County	(601) 378-5861
Miss-Lou Computer Center/Natchez	(601) 442-2836
Programs Unlimited/Jackson	To come
Southeastern Aud. Vis./Starkville	(601) 324-0797
MISSOURI	
Computer Concepts/Columbia	(314) 874-3216
Computerland/St. Louis	(314) 567-3291
Famous-Barr Computer Ctr./St. Louis	(314) 241-5469
Gateway Electrs/St. Louis	(314) 427-6116
Micro-Age Computer Ctr./St. Louis	(314) 567-7644
Sorbus Station/Maryland Heights	(314) 432-0425
Computer Mart/Springfield	(417) 862-6500
House of Computers/Joplin	(417) 782-0880
Commonwealth Computers, Inc./Kansas City	(816) 356-6502
Computer Core/Kirksville	(816) 627-1255
Computerland	(816) 436-3737
Computerland	(816) 364-4498
Computerland/Independence	(816) 461-6502
Computerland/Kansas City	(816) 842-4481
Midwest Computer Systems, Inc./Carrollton	(816) 542-0022
University Bookstore/NW MO. State U/Maryville	(816) 582-5151
MONTANA	
Art's Electronics/Great Falls	(406) 453-8543
Computerland/Billings	(406) 259-0565
Computerland/Great Falls	(406) 727-8700
Consolidated Services/Amissonla	(406) 721-1811
Emery Computers Inc/Great Falls	(406) 761-8954
Prairie Computers/Great Falls	(406) 727-6992
Video Computer Store/Great Falls	(406) 727-2720
NEBRASKA	
Eakes Office Prod. Ctr./Grand Island	(308) 382-8026
Computerland/Omaha	(402) 391-6716
Electronic Center/Lincoln	(402) 476-7331
M & A Computer Services, Inc./Hastings	(402) 462-9545
Micro Technologies/Lincoln	(402) 467-5521
Sunshine Computer & Software Center/Hastings	(402) 462-5300
2001/Norfolk	(402) 371-2247
NEVADA	
Apple Tree Electronics/Las Vegas	(702) 459-4114
Harry's Business Maxhines/Reno	(702) 322-4559
Home Computers/Las Vegas	(702) 736-6363
PCS Computer Service/Las Vegas	(702) 870-4138
NEW HAMPSHIRE	
Bitznbytes/Concord	(603) 224-8233
Bookwrights/Manchester	(603) 669-4915
Computerland of Manchester	(603) 668-2110
Computerland/Nashua	(603) 889-5238
Computer Mart/Nashua	(603) 883-2386
Computer Town/Salem	(603) 893-8812
Microcon Software Centers/Manchester	(603) 668-4080
North Country Computer Center/Plymouth	(603) 536-4163
NEW JERSEY	
Apple Coor/Basking Ridge	(201) 766-3977
Computer Dimensions/Westfield	(201) 232-8300
Computer Discount of NJ/Mahwah	(201) 529-4026
Computerland/Paramus	(201) 845-9303
Computerland/Eatontown	(201) 389-2333
Computerland/Morristown	(201) 539-4077
Computer Mart of New Jersey/E. Hanover	(201) 428-0200
Computer Mart of New Jersey/Green Brook	(201) 752-6300
Computer Mart of New Jersey/Iselin	(201) 283-0600
Computer Nook/Pine Brook	(201) 575-9468
Computer Technicians/E. Brunswick	(201) 238-2780
Computer Universe/Paramus	(201) 262-0960
Earth Rise Micro Sys./Madison	(201) 822-0518
Entre Computer Center/Paramus	(201) 342-0080
Felice's Follies/Red Bank	(201) 842-2862
Heathkit Electr. Ctr./Fairlawn	(201) 791-6935
Jefferson Computer Center/Lake Hopatcong	(201) 663-0224
Lloyd's Computers/Ridgewood	(201) 445-8801
Micro Computer Svcs./Warren	(201) 647-3900
MicroDynamics International/Englishtown	(201) 462-4600
Monmouth Computer Services/Shrewsbury	(201) 747-6745
Programs Unlimited/Greenbrook	(201) To Come
Programs Unlimited/Paramus	(201) 845-5800
Software City/Fairview	(201) 943-9444
Software City/Midland Park	(201) 447-9794
Software City/Pinebrook	(201) 575-4574
Software City/Teaneck	(201) 692-8317
Software Land/Elmwood Park	(201) 791-9557
Software Network/Upper Montclair	(201) 744-2952
Stonehenge Computer/Summit	(201) 277-1020
The Computer Center, Inc./Montvale	(201) 391-1006
Village Computer & Software Center/Cedar Knolls	(201) 540-0505
Vista Computer Shop/Matawan	(201) 566-6066
William Electrs Supply/Edison	(201) 985-3700
Atlantic Computer Systems/Toms River	(609) 240-3101
Computer Encounter/Princeton	(609) 924-8757
Computer Mart of New Jersey/Lawrenceville	(609) 452-1858
Computer Workshop/Cherry Hill	(609) 665-4404
Computerland/Cherry Hill	(609) 795-5900
Computerland/Lawrenceville	(609) 882-1400
Computerland/Northfield	(609) 646-6611
MicroCon Software Centers/Lawrenceville	(609) 799-6444
Radio Shack/Moorestown	(609) 244-7494
Radio Shack/Toms River	(609) 234-2666
Software City/Princeton	(609) 683-1644
Sorbus Station	(609) 662-0997
The Software Center/Rocky Hill	(609) 924-4988
NEW MEXICO	
Computer Shop/Clovis	(505) 762-3327
Computerland/Santa Fe	(505) 988-8800
Computer Superstore/Albuquerque	(505) 293-5370
Computer Tech Assoc./Las Cruces	(915) 533-2108
NEW YORK	
Computer Center/New York	(212) 889-8130
Computer Discount Services/New York	(212) 757-8698
The Computer Edge/Mt. Kisco	(914) 666-6337
Computer Era/New York	(212) 860-0500
Computerland	(212) 840-3223
Computerland of Little Neck	(212) 423-5280
Computerland of Wall Street/NY	To Come
Comtek/Brooklyn	(212) 962-6131
Comtek/Staten Island	(212) 698-7050
Control Data Business Centers/NY	(212) 887-1020
Datel Sys./New York	(212) 921-0110
Discount Book Warehouse/Brooklyn	(212) 646-5225
The Great American Software Store Ltd./Flushing	(212) 357-5522
Greenwich Village Computers/New York	(212) 254-9191
J&R Music World/New York	(212) 732-8600
Leigh's Computer World/New York	(212) 879-6257
Magazine Emporium/New York	(212) 864-0500
Majority New Dist./New York	(212) 243-7770
Papyrus Books/New York	(212) 864-8862
Programs Unlimited of Smithaven	To Come
Software City/Forest Hills	(212) 261-1141
Super Business Machines/New York	(212) 964-6666
Compu-Tech/Camillus	(315) 471-7773
Computerland/Massina	(315) 769-9971
Computers Etc./Syracuse	(315) 446-6502
Omnifax Computer Store/Syracuse	(315) 446-1284
Radio World, Inc./Oriskany	(315) 736-0184
Computer Headquarters/Selden	(516) 698-8636
Computer Microsystems/Manhasset	(516) 627-3640
Computer Shoppe/Patchogue	(516) 758-6558
Computerland/Little Neck	(516) 887-4747
Computerland/Nassau County	(516) 742-2262
Control Data Business Centers/Garden City	(516) 222-6440
Data Scan Comp. Sys./Farmingville	(516) 698-6285
Future Visions Computer/Melville	(516) 423-7820
Harrison Radio/Farmingdale	(516) 293-7990
Heathkit Electrs./Jericho	(516) 334-8181
Programs Unlimited/Commack	(516) To Come
Programs Unlimited/Jericho	(516) 997-8668
Spartan Electrs/Commack	(516) 499-9500
Syosset Video & Electrs./Syosset	(516) 921-5454
The Xerox Store/Garden City	(516) 294-6060
The Xerox Store/Great Neck	(516) 829-3700
Castle Computers/Latham	(518) 783-9405
Computer Room/Albany	(518) 869-3818
Foothills Computer/Glens Falls	(518) 792-0369
Future Distribution/Mooers	(518) 561-5703
Lela Computer Suitors/Albany	(518) 272-2691
Computer Tree/Endwell	(607) 748-1223
Computerland/Ithaca	(607) 277-4888
Computerland/Johnson City	(607) 277-4888
Computerland/Ithaca	(607) 277-4888
Computerland/Johnson City	(607) 277-4888
Computerland/Ithaca	(607) 277-4888
Computer Systems Center/Depew	(716) 668-5998
Computerland/Rochester	(716) 586-0378
Home Computer Ctr./Rochester	(716) 244-6237
Micro Age Computer Store/Rochester	(716) 244-9000
Modern Tek Shop, Inc./Snyder	(716) 839-5800
Readout Computers/Buffalo	(716) 634-9354
All Things Computer/Scarsdale	(914) 723-6262
Computer Corner/White Plains	(914) 949-3282
Computer Store/White Plains	(914) 428-1661
Computerland of Rockland/New City	(914) 638-4440
Heathkit/N. White Plains	(914) 761-7690
ICCS Computer center/Mt Kisco	(914) 666-2358
Mr. Computer/Wappinger Falls	(914) 297-1223
Mr. Oz News Center Book Store/New City	(914) 638-0990
Programs Unlimited/White Plains	(914) 761-9283
Software Etc./Central Nyack	(914) 358-3004
NORTH CAROLINA	
Computer Alternatives/Asheville	(704) 274-5404
Computer Alternatives/Hickory	(704) 324-2040
Computeroom/Charlotte	(704) 377-9821
Dunlap Electronics/Wingate	(704) 233-4996
Micro Management Products/Salisbury	(704) 637-0335
Computer Alternatives/Wilmington	(919) 799-5440
Computer Tree/Winston-Salem	(919) 768-9820
Computerland/Greenville	(919) 355-6110
The ComputerWare Store/Jacksonville	(919) 346-8499
K & S Newstand/Winston-Salem	(919) 724-7537
The Program Center/Greensboro	(919) 454-4708
Worldwide News & Specialties/Cary	(919) 467-7130
NORTH DAKOTA	
Computer 1/Fargo	(701) 282-9471
Computerland/Fargo	(701) 237-3069
Computerland Minot/Minot	(701) 838-1266

OHIO	
All Media Material/Kent	(216) 678-5499
Cleveland Computer Co./Mentor	(216) 946-1722
Com-Tutor/Youngstown	(216) 758-2020
Computer Basics/Bedford	(216) 232-5633
Computer Warehouse/Euclid	(216) 481-1600
Computer-Site/Strongsville	(216) 572-7483
Computerland/Akron-Canton	(216) 493-7786
Computerland of Cleveland/ N. Olmstead	(216) 461-1200
Computerland/Warren	(216) 544-4191
Computer World/N. Canton	(216) 478-0033
The Corner Store/Median	(216) 722-2777
Cosmic Comics/Cleveland	(216) 784-3449
Genesis Information Systems/Akron	(216) 836-9351
Hudson Computer/Hudson	(216) 653-9010
News Depot/Canton	(216) 454-4444
The Newstand/Cuyahoga Falls	(216) 235-9321
North Coast Computers/Bay Village	(216) 835-4345
PEP TV & Computers/Parma	(216) 888-5500
Video & Computer Place, Inc./Medina	(216) 722-0770
Abacus II/Toledo	(419) 865-1009
CP & You/Toledo	(419) 535-0130
Leo's Book & Wine Shop/Toledo	(419) 255-5506
The Open Book/Findlay	(419) 423-1283
Programs Unlimited/Mansfield Hgts.	To Come
Computerland of Dayton	(513) 439-1000
Electronic Connexion/Kettering	(513) 294-0222
Future Now/Cincinnati	(513) 791-4700
Micro Computer Ctr./Dayton	(513) 435-9355
News - Readers/Fairborn	(513) 879-4444
Marion Computer Center/Marion	(614) 383-1101
Micro Age Computer Store/Columbus	(614) 868-1550
Micro Center/Columbus	(614) 486-5381
The Program Store/Columbus	(614) 457-1153
Programs Unlimited/Worthington	(614) 431-2228
Computerland/Youngstown	To Come
OKLAHOMA	
Book Shack/Enid	(405) 233-1588
Computer Service Unlimited/Norman	(405) 329-2154
Computer Utility/Ada	(405) 332-4858
Computer Works/Stillwater	(405) 624-5276
Computerland/Oklahoma	(405) 755-5200
Computerland of Oklahoma/ Oklahoma City	(405) 634-4300
Employee's Assoc. Bookstore/Okla. City	(405) 686-4295
High Technology Retail/Oklahoma City	(405) 528-8008
Micro Age Computer/Oklahoma City	(405) 728-1837
University Ctr. Book/Edmond	(405) 341-2980
American Small Business Computers/ Pryor	(918) 825-4844
Computer Store/Tulsa	(918) 224-5347
Computerland/Tulsa	(918) 481-0332
MicroAge Computer Store/Tulsa	To Come
OREGON	
Book world/Salem	(503) 399-7073
Bookland Crown & Quill/Medford	(503) 779-5720
Computer Solutions/Eugene	(503) 689-9677
Computer Specialties/Salem	(503) 399-0534
Computer Store/Corvallis	(503) 754-0811
Computerland/Portland	(503) 620-6170
Compuware/McMinnville	(503) 472-2972
Fifth Avenue News/Portland	(503) 222-7462
Hood River Computers/Hood River	(503) 386-9311
Pegasus Computer Store/Portland	(503) 256-4713
Rich Cigar Store/Portland	(503) 228-1700
PENNSYLVANIA	
A B Computers/Montgomeryville	(215) 822-7727
Bookarama/Allentown - Whitehall	To come
Computer Forum/Frazer	(215) 296-3474
Computerland/Dresher	(215) 542-8835
Computerland/Lancaster	(215) 436-0422
Computerland Lehigh Valley/Allentown Whitehall Lehigh Valley	(215) 776-0202
Computerland/Paoli	(215) 296-0210
Computerland/Philadelphia	(215) 568-9930
The Computer Source/W. Reading	(215) 375-4231
Doc's Computer Supply Center/Ardmore	(215) 642-6550
Drexel University Book Store/ Philadelphia	(215) 895-2000
Heathkit Electr. Ctr./Frazer	(215) 288-0180
Heathkit Electr. Ctr./Philadelphia	(215) 288-0180
Intelligent Electronics/Lionville	(215) 524-1800
Main Line Computer Center/Wayne	(215) 687-8500
Marketline Sys./Southampton	(215) 355-5400
Micro Computer Center/Media	(215) 565-1380
Never Ltd., Personal Software/Malvern	(215) 296-2726
Robec, Inc./Line Lexington	(215) 822-0700
Solutions Computer Store/Doylestown	(215) 345-4411
Sorbus Station/King of Prussia	(215) 337-9800
Tree of Knowledge/Reading	(215) 375-0224
Video Village Computer Center/ Philadelphia	(215) 969-5270
The Computer Center/Greensburg	(412) 834-7636
Computer House/Pittsburgh	(412) 921-1333
Pittsburgh Area Computer/Glenshaw	(412) 931-5005
Pittsburgh Computer Store/Pittsburgh	(412) 391-8050
The Program store/Greensburg	(412) 838-1604
Soft-Warehouse/Pittsburgh	(412) 271-0915
Computers Unlimited/York	(717) 755-1045
North Central Digital Systems/Danville	(717) 275-4900
One Stop Computer Shoppe/Le Moyne	(717) 761-6754
Computerland Harrisburg/ Mechanicsburg	(814) 533-6892
Designware, Inc./State College	(814) 234-3586
Erie Computer Co./Erie	(814) 454-7652
Software City/Exton	To Come
RHODE ISLAND	
Abacus Computer Svcs./Providence	(401) 274-3061
Computerland/Providence	(401) 274-5100
Computron/Woonsocket	(401) 765-3037
Software Connections/Warwick	(401) 738-3430
SOUTH CAROLINA	
Colsmo Comm/Rockhill	(803) 366-7157
Computer Source/Charleston	(803) 571-1452
Computerland/Anderson	(803) 224-5428
SOUTH DAKOTA	
Computerland/Rapid City	(605) 348-5384
Computerland/Sioux Falls	(605) 338-5263
TENNESSEE	
Campus Computers/Nashville	(615) 327-9123
Chattanooga Computer Ctr.	(615) 892-7038
Computerland of Chattanooga	(615) 892-0840
Computerland/Knoxville	(615) 693-8225
Computerland of Nashville	(615) 292-8088
Crabtree Computer World/Chattanooga	(615) 870-2224
Eastern Micro Computer/Knoxville	(615) 594-8365
MicroAge Computer Store/Nashville	(615) 327-9669
Programs Unlimited/Nashville	(615) 385-3444
Rush Elects/Bristol	(615) 764-0831
Computer Lab/Memphis	(901) 761-4743
Computerland/Memphis	(901) 767-0233
Tobacco Corner/Memphis	(901) 682-3326
TEXAS	
Compu Shop/Richardson	(214) 783-1252
Computer Video Sys./Plano	(214) 423-3654
Computerland/Richardson	(214) 363-2223
Computerland/Tyler	(214) 581-7000
Marketland/Richardson	(214) 680-2820
Simtec/Dallas	(214) 484-3319
The Xerox Store/Dallas Prestonwood	(214) 385-7235
The Xerox Store/Dallas Charuth Plaza	(214) 739-5861
The Xerox Store/Dallas Bryan St.	(214) 748-5085
The Xerox Store/Richardson	(214) 783-2300
Software & Things/Austin	(512) 451-4347
Software Access/Irving	(214) 255-5615
Software Concepts/Dallas	(214) 458-0330
Softwares/Dallas	(214) 644-5043
Strictly Software/Dallas	(214) 392-3030
U.S. Software/Dallas	(214) 357-7800
Capital Micro/Austin	(512) 472-7590
Computer Solutions/Austin	(512) 327-8393
Computer Solutions/San Antonio	(512) 341-8851
Computer To-Go/Austin	(512) 472-8926
Computerland/Austin	(512) 452-5701
Douglas Electronics/Corpus Christi	(512) 883-5103
Expensive Toys/Big Boys/San Antonio	(512) 340-5700
Heathkit/San Antonio	(512) 341-8876
The Homing Pidgeon/Elgin	(512) 276-7962
The Right Stuff/Austin	(512) 346-1321
The Software Place/Austin	(512) 453-0851
City Electr. Supply/Houston	(713) 621-1060
Computer Center/Houston	(713) 527-8008
Computer Galleries/Houston	(713) 956-0900
Computerland of Houston/Northwest	(713) 859-5030
Computerland Houston Bay/Houston	(713) 488-8153
Computerland of Houston/Westchase	(713) 558-1200
Computerland/Westwood	(713) 270-1200
Computerland of Brazos Valley	(713) 846-2378
Computerland of Pasadena	(713) 473-1200
Gateway Electrs./Houston	(713) 978-6575
Joystix, Inc./Houston	(713) 266-7122
Lone Star News/Houston	(713) 981-0288
Micro Age Computer Store/Houston	(713) 943-2124
Micro Age Computer Store/Houston	(713) 270-9647
Micro Age Computer Store/Houston	(713) 440-7547
Northwest Newstand/Houston	(713) 681-7310
Simtec/Houston	To Come
Software Station/Houston	(713) 783-5935
Waghalter Books/Houston	(713) 627-9970
Westheimer Newstand/Houston	(713) 781-7793
The Xerox Store/Houston	(713) 654-8913
The Xerox Store/Houston Greenspoint	(713) 999-5472
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Young Electrs./College Station	(713) 693-8080
Agriplex Computers/Lubbock	(806) 797-4495
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Computer Pro/Ft. Worth	(817) 654-3360
Computer Vision/Arlington	(817) 274-6608
Heathkit/Ft. Worth	(817) 737-8822
Computer Tech Assoc./El Paso	(915) 533-2108
Computer Technology Assoc./Midland	(915) 699-5046
Computer West/San Angelo	(915) 655-3391
Micro Logic Computer Store/El Paso	(915) 591-3349
Mnemonics Computer Store/El Paso	(915) 778-2708
UTAH	
Computerland/Orem	(801) 224-2608
Computerland/Salt Lake	(801) 364-4416
Personal Business Computers/ Salt Lake City	(801) 486-4839
Quality Technology/Salt Lake City	(801) 521-5040
VERMONT	
Datatronics Inc./Brattleboro	(802) 257-0555
Video Connection/Brattleboro	(802) 254-6026
VIRGINIA	
Computer Store/McLean	(617) 272-0294
Community Computers/Arlington	(703) 527-4600
Computer Works/Harrisonburg	(703) 434-1120
Computers Plus/Alexandria	(703) 971-1996
Computerland/Roanoke	(703) 342-1333
Computerland/Woodbridge	(703) 491-4151
Computerland Tysons Corner/Vienna	(703) 893-0424
H.B. Computer Ctr./Charlottesville	(703) 295-1975
Heathkit Electrs./Alexandria	(703) 765-5515
Home Computer Ctr./Newport News	(703) 595-1955
Jack L. Hartman & Co., Inc./Roanoke	(703) 362-1891
New Concepts, Inc./Christiansburg	(703) 382-6193
On Line Computer Centers/Fairfax	(703) 280-1600
Program Store/Falls Church	(703) 536-5404
Virginia Micro Sys./Woodbridge	(703) 491-6502
V.P.I. Facilities/Blacksburg	(703) 961-5991
The Program Store/Vienna	(703) 556-9778
The Xerox Store/Fairfax	(703) 591-8845
The Xerox Store/Vienna	(703) 442-9655
University Computers Inc./Alexandria	(703) 379-0367
Zainax Systems Corp./Vienna	(703) 442-0551
Compu-Play/Federal Way	To Come
Computerland/Charlottesville	(804) 973-5701
Computerland/Norfolk	(804) 625-3427
Computerland/Richmond	(804) 741-3536
Data Base/Richmond	(804) 282-1817
The Program Store/Falls Church	(804) 536-5040
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A B C Comm./Seattle	(206) 364-8300
Almac-Stroum/Bellevue	(206) 643-9992
Amateur Radio Supply Co./Seattle	(206) 767-3222
Byte Shop/Seattle	(206) 622-7196
Central Computers/Bellevue	(206) 746-5227
City News/Bellevue	(206) 455-9683
Computer & Video Ctr./Vancouver	(206) 695-1540
Computerland	(206) 581-0388
Data-Borne Computers/Renton	(206) 248-0101
Empire Electrs./Seattle	(206) 244-5200
Heathkit/Seattle	(206) 682-2172
Heathkit/Tukwila	(206) 246-5357
Orion Computerware	(206) 774-7323
Swan Computers, Inc./Bellevue	(206) 454-6272
Western Micro Computer Ctr./ Bellingham	(206) 676-9558
The Xerox Store/Redmond	(206) 643-2600
The xerox store/Seattle	(206) 622-8414
The Xerox Store/Tukwila	(206) 575-1212
Alpha Computer Center/Richland	(509) 943-5608
Alpha Computer Sys./Kennewick	(509) 586-7603
Computer Systems/Yakima	(509) 248-8309
Rob Roy Computer Shop/Yakima	(509) 575-7704
WISCONSIN	
Asmus Electronics/Fond Du Lac	(414) 923-4107
Byte Shop/Milwaukee	(414) 281-7004
Chester Electr. Supply/Kenosha	(414) 658-4616
Computer Plus, Inc./Milwaukee	(414) 321-1770
Computerland/Waukesha	(414) 544-4100
Computerland of Ozaukee/Mequan	(414) 242-9490
Computers Unlimited/Milwaukee	(414) 355-5206
Computerworld/Appleton	(414) 733-9547
Crimson Computers/Milwaukee	(414) 464-8690
Digital Den/Wauwatosa	(414) 475-6020
Four J's/Milwaukee	(414) 466-8990
North Shore Computers/Milwaukee	(414) 963-9700
Prospect News/Milwaukee	(414) 276-6110
American Computer Sys./Madison	(608) 257-1348
Computerland/LaCrosse	(608) 781-2090
Computerland/Madison	(608) 273-2020
Computerland/Eau Claire	(715) 835-8082
WEST VIRGINIA	
Computer Store/Charleston	(304) 345-1360
Computerland/S. Charleston	(304) 744-7962
Computerland/Parkersburg	(304) 485-6823
Nicks News/Huntington	(304) 697-2459
Solutions, Inc./Barboursville	(304) 736-0762
CANADA	
Galatica Computers	(403) 424-7007
Hindson Computing Systems, Ltd./ Calgary	(403) 252-9576
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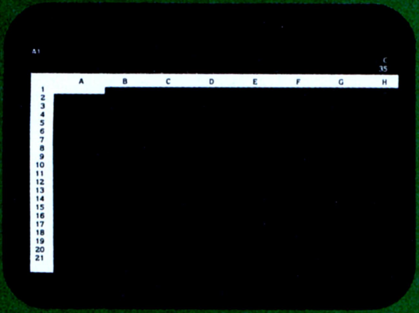

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Make comparisons. Compare Multiplan to any of the earlier electronic worksheets. We've given you some "prompts" above.

Compare learning time. Multiplan's tutorial book brings you up to speed. Fast. But Multiplan doesn't stop there. Multiplan's On-line Reference Guide gives you instant help if you have questions. It knows where you are in Multiplan and offers information related to your problem, right on the screen.

Compare ease of use. All Multiplan prompts are full length words or phrases. And Multiplan provides "naming," the ability to assign a plain English name to any cell or area. "Gross Profit = Sales—Cost" rather than "AA44=AZ23—BK154." Which means you can work more intuitively. And faster.

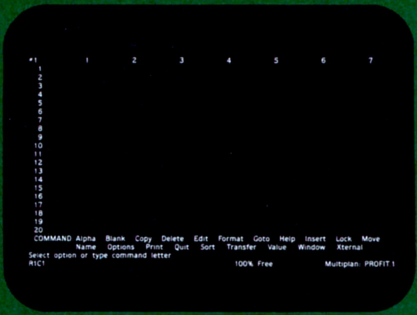
Compare utility. Multiplan lets you link related worksheets so that information is transferred between them automatically. For instance, you can keep regional sales forecasts on separate sheets but link them with your overall company forecast. Then, just change the forecast for any region, and the company forecast sheet is updated automatically. Something you can't do with first generation worksheets.

Compare reports. Not just the work you can do, but the way you can present it. Multiplan's flexible formatting options allow you to produce presentation-quality reports. And its sorting capability lets you sort by either alphabetic or numeric order. So a sales manager who normally lists sales regions alphabetically could sort by amount sold and conveniently rank by sales performance. The

*Based on features in releases VC-202B0-AP2 and VC-156Y0-IBM of VisiCalc on the Apple II and IBM-PC respectively.

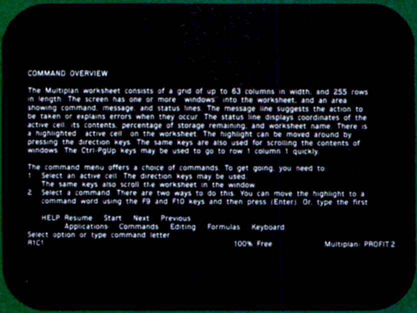
MULTIPLAN

NOW AVAILABLE FOR THE IBM PERSONAL COMPUTER



```
#1      1       2       3       4       5       6       7
  1
  2
  3
  4
  5
  6
  7
  8
  9
 10
 11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 COMMAND Alpha  Blank  Copy  Delete  Edit  Format  Goto  Help  Insert  Lock  Move
         Name   Options  Print  Quit  Sort  Transfer  Value  Window  Xternal
Select option or type command letter
R1C1                                   100% Free        Multiplan: PROFIT.1
```

INTERACTIVE ELECTRONIC WORKSHEET **YES**



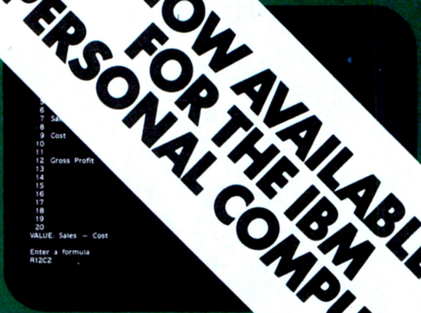
```
COMMAND OVERVIEW

The Multiplan worksheet consists of a grid of up to 63 columns in width, and 255 rows
in length. The screen has one or more "windows" into the worksheet, and an area
showing command, message, and status lines. The message line suggests the action to
be taken or explains errors when they occur. The status line displays coordinates of the
active cell, its contents, percentage of storage remaining, and worksheet name. There is
a highlighted "active cell" on the worksheet. The highlight can be moved around by
pressing the direction keys. The same keys are also used for scrolling the contents of
windows. The Ctrl-PgUp keys may be used to go to row 1 column 1 quickly.

The command menu offers a choice of commands. To get going, you need to:
1  Select an active cell. The direction keys may be used.
   The same keys also scroll the worksheet in the window.
2  Select a command. There are two ways to do this. You can move the highlight to a
   command word using the F9 and F10 keys and then press (Enter). Or, type the first

   HELP Resume   Start   Next   Previous
        Applications   Commands   Editing   Formulas   Keyboard
Select option or type command letter
R1C1                                   100% Free        Multiplan: PROFIT.2
```

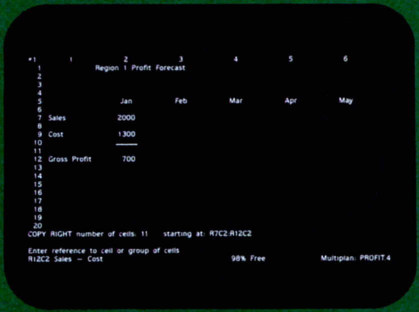
ON-LINE REFERENCE GUIDE **YES**



```
  6
  7 Sa
  8
  9 Cost
 10
 11
 12 Gross Profit
 13
 14
 15
 16
 17
 18
 19
 20
VALUE: Sales - Cost

Enter a formula
R12C2
```

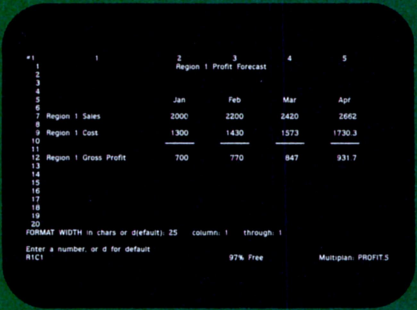
"NAMING" OF CELLS OR AREAS



```
#1      1           2          3          4          5          6
  1          Region 1 Profit Forecast
  2
  3
  4
  5                 Jan        Feb        Mar        Apr        May
  6
  7 Sales          2000
  8
  9 Cost           1300
 10                ----
 11
 12 Gross Profit    700
 13
 14
 15
 16
 17
 18
 19
 20
COPY RIGHT number of cells: 11    starting at: R7C2:R12C2

Enter reference to cell or group of cells
R12C2 Sales - Cost                     98% Free        Multiplan: PROFIT.4
```

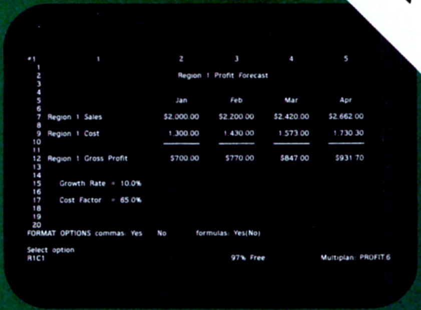
PLAIN ENGLISH PROMPTS **YES**



```
#1            1                 2         3         4         5
  1                             Region 1 Profit Forecast
  2
  3
  4
  5                            Jan       Feb       Mar       Apr
  6
  7 Region 1 Sales            2000      2200      2420      2662
  8
  9 Region 1 Cost             1300      1430      1573    1730.3
 10                           ----      ----      ----      ----
 11
 12 Region 1 Gross Profit      700       770       847     931.7
 13
 14
 15
 16
 17
 18
 19
 20
FORMAT WIDTH in chars or d(efault): 25    column: 1    through: 1

Enter a number, or d for default
R1C1                                   97% Free        Multiplan: PROFIT.5
```

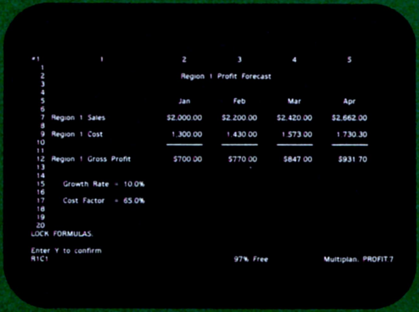
INDIVIDUAL COLUMN WIDTHS **YES**



```
#1            1                 2          3          4          5
  1
  2                             Region 1 Profit Forecast
  3
  4
  5                            Jan        Feb        Mar        Apr
  6
  7 Region 1 Sales       $2,000.00  $2,200.00  $2,420.00  $2,662.00
  8
  9 Region 1 Cost         1,300.00   1,430.00   1,573.00   1,730.30
 10                      ---------  ---------  ---------  ---------
 11
 12 Region 1 Gross Profit  $700.00    $770.00    $847.00    $931.70
 13
 14
 15    Growth Rate = 10.0%
 16
 17    Cost Factor  = 65.0%
 18
 19
 20
FORMAT OPTIONS commas: Yes   No      formulas: Yes(No)

Select option
R1C1                                   97% Free        Multiplan: PROFIT.6
```

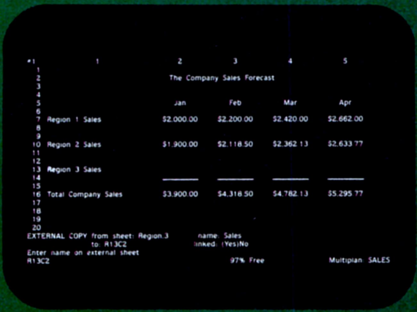
EXTENSIVE FORMATTING CAPABILITIES **YES**



```
#1            1                 2          3          4          5
  1
  2                             Region 1 Profit Forecast
  3
  4
  5                            Jan        Feb        Mar        Apr
  6
  7 Region 1 Sales       $2,000.00  $2,200.00  $2,420.00  $2,662.00
  8
  9 Region 1 Cost         1,300.00   1,430.00   1,573.00   1,730.30
 10                      ---------  ---------  ---------  ---------
 11
 12 Region 1 Gross Profit  $700.00    $770.00    $847.00    $931.70
 13
 14
 15    Growth Rate = 10.0%
 16
 17    Cost Factor  = 65.0%
 18
 19
 20
LOCK FORMULAS:

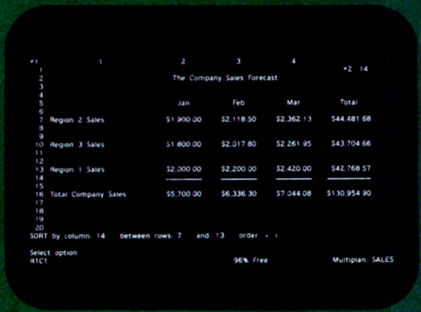
Enter Y to confirm
R1C1                                   97% Free        Multiplan: PROFIT.7
```

PROTECTED CELLS **YES**



```
#1            1                 2          3          4          5
  1
  2                          The Company Sales Forecast
  3
  4
  5                            Jan        Feb        Mar        Apr
  6
  7 Region 1 Sales       $2,000.00  $2,200.00  $2,420.00  $2,662.00
  8
  9
 10 Region 2 Sales       $1,900.00  $2,118.50  $2,362.13  $2,633.77
 11
 12
 13 Region 3 Sales
 14                      ---------  ---------  ---------  ---------
 15
 16 Total Company Sales  $3,900.00  $4,318.50  $4,782.13  $5,295.77
 17
 18
 19
 20
EXTERNAL COPY from sheet: Region.3       name: Sales
                  to: R13C2              linked: (Yes)No
Enter name on external sheet
R13C2                                  97% Free        Multiplan: SALES
```

MULTIPLE, LINKED WORKSHEETS **YES**



```
#1            1                 2          3          4
  1                                                            *2  14
  2                          The Company Sales Forecast
  3
  4
  5                            Jan        Feb        Mar        Total
  6
  7 Region 2 Sales       $1,900.00  $2,118.50  $2,362.13   $44,481.68
  8
  9
 10 Region 3 Sales       $1,800.00  $2,017.80  $2,261.95   $43,704.66
 11
 12
 13 Region 1 Sales       $2,000.00  $2,200.00  $2,420.00   $42,768.57
 14                      ---------  ---------  ---------   ----------
 15
 16 Total Company Sales  $5,700.00  $6,336.30  $7,044.08  $130,954.90
 17
 18
 19
 20
SORT by column: 14    between rows: 7    and: 13    order: > <

Select option
R1C1                                   96% Free        Multiplan: SALES
```

SORTING CAPABILITY **YES**

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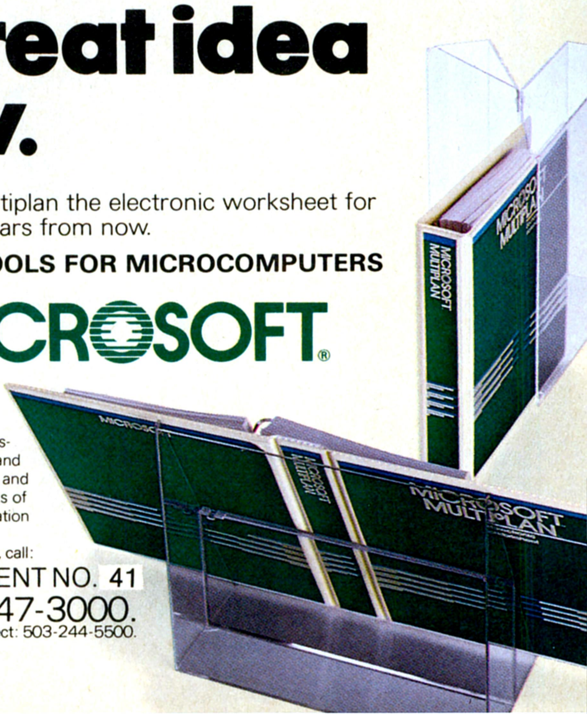

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Signature of requester
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Date

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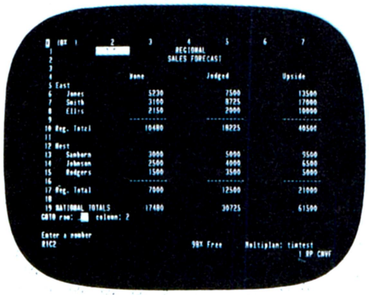

```
R  10%  1        2        3      4        5        6       7
 1                           REGIONAL
 2                        SALES FORECAST
 3
 4                None                Judged               Upside
 5 East
 6     Jones      5230                 7500                13500
 7     Smith      3100                 8725                17000
 8     Ellis      2150                 2000                10000
 9            ---------           ---------            ---------
10 Reg. Total    10480                18225                40500
11
12 West
13     Sanborn    3000                 5000                 5500
14     Johnson    2500                 4000                 6500
15     Rodgers    1500                 3500                 5000
16            ---------           ---------            ---------
17 Reg. Total     7000                12500                21000
18
19 NATIONAL TOTALS 17480              30725                61500
GOTO row: █  column: 2

Enter a number
R1C2                         98% Free     Multiplan: tintest
                                                    1 RP CNVF
```

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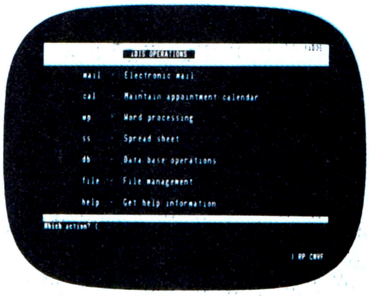

```
                    iDIS OPERATIONS

        mail  -  Electronic mail

        cal   -  Maintain appointment calendar

        wp    -  Word processing

        ss    -  Spread sheet

        db    -  Data base operations

        file  -  File management

        help  -  Get help information

Which action? (

                                              1 RP CNVF
```

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DOUBLE DENSITY
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CIRCLE 79

GEMS OF WISDOM

The Epson Gets The Message

When I began to use my Apple /// with an Epson MX-80 printer, I found the ability to send a print size and style message from VisiCalc to the MX-80 most convenient. After becoming completely spoiled by this ease, I wanted to be able to send the same kind of message to the printer when using AppleWriter ///.

I could find no instructions in the manual for this feature, so I called the dealer and he couldn't help. Quite by accident I learned that if I left the printer on after setting the size/style with VisiCalc, AppleWriter /// could also use it. It doesn't matter if the computer is shut down; it's only when the printer is shut down that it returns to default print when it's turned on again.

Ann Wittwer
OMAHA, NE

This Gem of Wisdom wins $25 for Ann Wittwer. If you have an anecdote, tip, or secret to share, send it (up to 250 words) to Gems of Wisdom Editor, Personal Computing, *50 Essex St., Rochelle Park, NJ 07662.*

Not Software Bound

At work, I inherited an unused NEC 8001A, primarily for word processing. Adapting myself to its keyboard eccentricities, I rolled through the tutorial of Select and looked forward to happy days of easy computing. That is, until I had to do some actual word processing.

Two "blank" disks I inherited along with the NEC actually had some outdated information on them. I was unable to erase the files using Select. No other disks were available and I was pressed for time. Whenever I tried to erase the files or format them, I got a "DOS error" message.

Then I looked through the CP/M manual. Deciphering its method for formatting, I decided to give that a go. I pulled the Select disk and booted CP/M. Then I tried formatting the "blank" disk. It worked! When I rebooted Select, it recognized a truly blank disk, formatted and ready to roll.

Moral: You're not bound to any specific software in use for formatting disks or for accomplishing other housekeeping tasks. Think big! If you're having problems getting a program to do a housekeeping chore, try the operating system, then return.

Ralph Fletch
BOCA RATON, FL

This Gem of Wisdom wins $25 for Ralph Fletch. If you have an anecdote, tip, or secret to share, send it (up to 250 words) to Gems of Wisdom Editor, Personal Computing, *50 Essex St., Rochelle Park, NJ 07662.*

PICKING A PORTABLE

(continued from page 101)

commonly used; picked the software packages that, in their opinion, best answer those application needs; and packaged the whole thing at a very attractive price.

OK. What if everything about the system is great, but you just don't like that software? Well, you have to make a choice. You either get the system, and spend the extra money required to get the software you really want; or, get the system and run the bundled software, even though you don't particularly like it. Or you can get a different system.

Bundled operating systems

The saving grace in all of this is the popularity of the bundled operating systems. If you don't like WordStar, or Perfect Writer, or whatever, there's no problem. Many word processors run under the CP/M operating system, the one supplied with most of the portables. There are many packages appearing now that run under MS-DOS, the IBM Personal Computer's operating system, and this system is being supplied with portable computers now, too. So even if you don't like a bundled application program, you will have a large number of equivalent packages to choose from for most of the portable computers.

The subject of operating systems leads us to consider IBM Personal Computer-compatibility. There are several levels of this compatibility. The DOT computer from Computer Devices is said to be software-compatible with the IBM machine. That means programs written for the IBM computer will run on the DOT. But be careful here. The DOT comes with the new 3½-inch disk drives, which are terrific for space saving, but are a non-standard storage medium. The standard is still in question within the industry, although Tom Hayes at Osborne thinks a standard will be adopted by the end of the year. In the meantime, you'd have to find a program for the IBM Personal Computer which is supplied on the smaller disks, which could be tough. Computer Devices supplies programs, of course, but availability from other publishers is doubtful. In this particular case, compatibility with the IBM Personal Computer means the DOT will run MS-DOS and programs that run under this operating system. It does not mean you can buy a program published for IBM and expect to put it in the DOT's drive and have it run.

The point here is that you have to be careful about compatibility with anything. Hayes says Osborne's new Executive computer, shown on this month's cover of *Personal Computing*, will, with the optional co-processor, run "most" programs written for the IBM Personal Computer. This means "all but the few which have been written to bypass MS-DOS for some I/O operations." If you have an IBM Personal Computer, and would like to get a portable that is compatible, a not unlikely possibility, find out whether your software will run on the Personal Computer-compatible machine (or CP/M portable machine, for that matter).

Portability can be a measurable advantage. A portable takes up very little space on the top of a desk, is easy to take with you on the road, doesn't cost an arm and a leg, and can be shared with your co-workers. You can easily take a portable with you on a vacation, if you're one of those who just has to work while away from the office. With the growing number of portables available, you're sure to find one that meets your needs. With these machines, as with any others, shop carefully to make sure that the system you buy fulfills the promise of personal, portable computing. You and your computer will have to work well together, if the partnership is to be a happy one.

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CIRCLE 80

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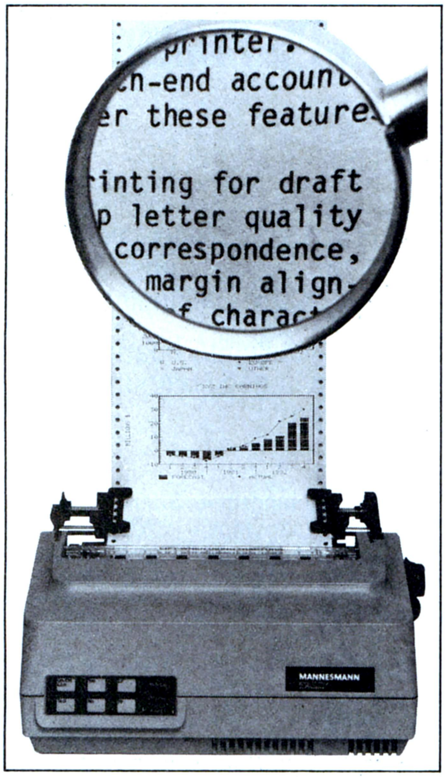

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CIRCLE 82

DATA BANKS

(continued from page 117)

two weeks; Merker promised it in 24 hours, and came through.

Texas entrepreneur Michael Sidoric attributes noticeable increases in his business to using the electronic mail facility of his DBRS. His company, Informedia, was founded 13 years ago as a partnership with his wife, June, when both were still students at the University of Texas in Austin. Today, the company, which produces audiovisual presentations, is still in Austin, and has added one employee. Their list of some 60 clients include IBM's Austin division, Texas Tourist Development Agency, Southwest Bell, and Southland Corp. of 7-11 Stores' fame.

Sidoric says the main advantage to using a DBRS is the time savings. Before he became a subscriber, a presentation to a client in Dallas or Houston cost him a full day, not to mention air fares and car rental fees. "Now," he says, "we're able to send things via electronic mail . . . . I can send the entire file to the client in a matter of minutes. When he gets in the next morning, he can get that file from his electronic mail box, print it out, react to it, get other people to look at it and react to it, and send me comments and criticisms. He can even feed it into his own word processor and make factual corrections, and send it back to me. All that time, I'm still working on projects that require attention here in Austin."

Although Sidoric has two personal computers—including a modified Apple that specializes in audiovisual work—he also uses his DBRS's computing power. "I can do word processing and scores of things that I couldn't afford the software for," he says. "It gives the small-computer owner tremendous power for very small cost."

"It's the same with financial planning," he says. "I can do our day-to-day stuff here, but when I'm working on really involved things, it's a lot easier to use their on-line system, which is virtually unlimited."

DBRSs can offer measurable benefits to most business people and professionals—if they select their DBRS with care and use it judiciously. The first step is finding the DBRS most likely to provide the required information.

Costs considered

On-line costs vary with the data base, starting at $5 an hour (at night or on weekends) and going up from there. Some services require a one-time subscription fee of $100; others are as high as $50,000 and more. The more popular DBRSs, such as The Source, CompuServe, and DIALOG (which is heavily oriented toward business, science, and technology) offer special discounts. In addition to the usage charge, there are often communications network charges and local telephone call charges. (Many DBRSs use private communications carriers readily accessed by a local call in most U.S. and Canadian cities.) According to DIALOG, "A typical search on a single data base averages about 10 minutes for experienced searchers and 15 minutes for beginners. Depending on the data base, a 10-minute search could range from $5 to approximately $15 (or somewhat more in some of the specialized data bases)"—hardly a clearcut estimate. Although charges are quoted on an hourly basis, they are always calculated to the nearest whole minute of actual use. Most DBRSs provide a cost breakdown at the conclusion of the search.

In July 1980, when Eastman Kodak raised its film prices by 30 percent, Mike Sidoric raised his by 10 percent. He has not raised them since, and, at this writing, had no intention of doing so. "It's got to stop somewhere," he says of the inflationary spiral. "Instead of working harder, we need to work smarter."

Plugging in to a DBRS may be one way of doing just that.

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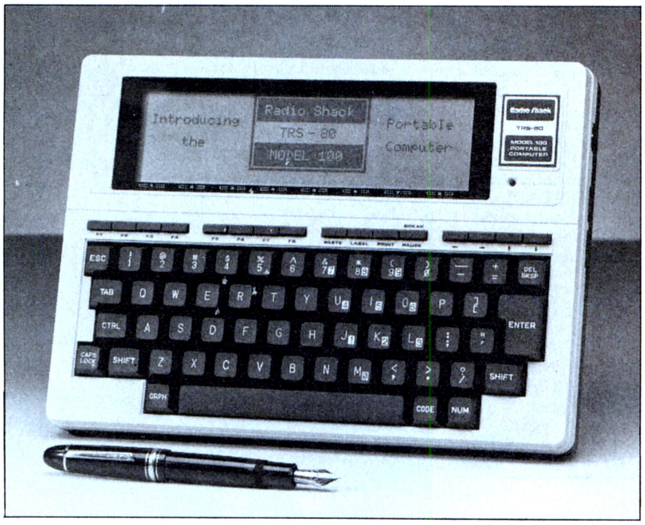
New Products Reflect Advances In Hardware Design

Each month Personal Computing *scans the hardware market to keep you up to date on everything that's new. Those products we consider to be most useful and exciting in this month's crop are described in this section and commended for your closer examination. Others are listed in Showcase of Products, our special subscriber section.*

LIGHTWEIGHT PORTABLE IS FUNCTIONAL AND USER-FRIENDLY

The Radio Shack TRS-80 Model 100 is a portable computer that approaches the concept of portability with unusual practicality, and the result, the Micro Executive Workstation, is bound to attract considerable attention. The Model 100 packs a great deal of functionality plus user friendliness into a 2 by 11 by 8½- inch package that weighs only 4 pounds.

The first aspect that catches the eye is the LCD screen, which offers eight lines of 40 upper- and lowercase characters—a large enough display for convenient word processing. The keyboard is a full typewriter layout, with a solid feeling, and an "imbedded" numerical keypad—meaning one portion of the keyboard is software-selectable to operate as a 10-key data pad. In addition, directly below the screen is a row of programmable function keys and four cursor-control keys. The Model 100 includes a built-in real-time clock, a 300-baud modem, and RAM capacity of 8k, expandable to 32k.



The Radio Shack TRS-80 Model 100 portable computer includes a built-in clock, a 300-baud modem, and 8k of RAM.

The Model 100's specifications are impressive (in addition to the above features it includes such niceties as a five-octave sound generator, bit-addressable graphics, and RS-232-C and parallel outputs). But what makes this a unique portable is the application software included—text editor, scheduler, address handler, a sophisticated communications program, and Microsoft Extended BASIC—all resident in 32k of ROM.

As soon as power is on, the display shows the date and time of day, and offers a menu of functions along with listing of any files the user may have set up. By switching into TEXT, a user can create and edit notes and memos with a word-processing program that offers quite a bit of flexibility; the function keys (which are automatically assigned as needed when switching into any given mode) offer commands such as "Copy," "Cut," and "Select," including the ability to move blocks of text with cut-and-paste techniques. The cursor control keys can be used in conjunction with the shift and control keys to provide a variety of cursor movements in the text mode. The output can be transferred to any Radio Shack parallel printer, or standard ASCII text files can be sent to another computer for additional processing.

The second application program is a scheduler which allows the user to keep a schedule of appointments, listed by date and time, and then search it on the basis of any given characteristic. A similar search routine is available for the third application, the address organizer. Entered in random order, addresses and telephone numbers may be accessed by any identifying characteristic and listed on the screen or printer. In addition, this mode can make use of the built-in modem: When a given telephone number is displayed on the screen, the auto-dial function can be used to dial the number directly. The auto-dial function includes a pause character, to allow calling through switchboards.

This brings us to the Model 100's fourth, and perhaps most impressive software feature: a communications program called TELCOM. TELCOM operates with the built-in, 300-baud direct-connect modem which connects to the telephone line via a standard Bell modular plug on the back of the unit. (An acoustic-coupled modem will soon be available for the Model 100, for situations where direct-connect is impossible.)

In TELCOM, all RS-232-C and modem parameters are keyboard selectable, including half- or full-duplex communication and one-key uploading or downloading of ASCII text files. In addition to auto-dial, the TELCOM software allows auto log-on for information utilities, as well as commands for going directly to the portion of the service you want. In practice what this means is that with a short BASIC program provided in the Model 100 manual, the user can telephone, say, the Dow Jones News/Retrieval Service, receive quotations on any number of specific stocks, download and store the information, and sign off—all with a single keystroke.

The Model 100 operates on four AA batteries or an AC adaptor, in conjunction with built-in nickel cadmium batteries that maintain the unit's memory for up to 30 days when the power is off. The ni-cads recharge off either the AA batteries or the AC adaptor. A user-definable auto shut-off saves batteries, without any loss of programs or memory, and a low-battery indicator signals when only 15 minutes of power remain. The Model 100 has a full bus line, allowing a potentially wide range of peripherals; a bar-code reader will probably be among the first of those. In addition, on the bottom of the machine is a plate covering an additional ROM socket for application programs; an early contender here is likely to be some form of spreadsheet.

With 8k of memory, the Model 100 will cost $799; the 24k version will list at $999. Optional 8k add-ons ($199.95 plus installation) can increase the memory to a maximum of 32k. In all, the Model 100's combination of full keyboard and large display, along with application software tailored to the needs of a traveling executive, provides an impressive package that could set the standard for portable computers.

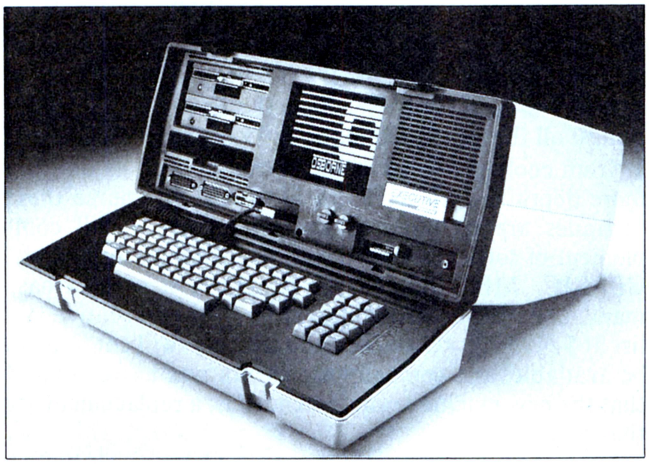
FOR MORE INFORMATION: RADIO SHACK, 1800 One Tandy Center, Fort Worth, TX 76102, or visit your local Radio Shack store or Computer Center.

—Michael Rogers, Senior Editor

OSBORNE EXECUTIVE DEBUTS

The Osborne Executive, an updated version of the best selling Osborne 1 portable computer, has arrived. The Executive is designed not only to answer some of the objections to the original, but to expand into new territory as well.

The first thing Osborne owners will notice about the Executive is that the old screen, which many users supplemented with an external monitor, has been replaced by a 7-inch amber screen. Amber is the color considered by many to provide the most comfortable viewing, and is required by law in some European countries. In another screen improvement over the Osborne 1, the Executive will arrive with a standard 24 by 80 display. Osborne made room for the expanded monitor by converting to "half-high" floppy disk drives and moving both drives to one side of the screen. This leaves room for storing up to 40 diskettes, and also opens up space for a possible integral Winchester disk—although Osborne designers are still trying to determine whether there exists a hard disk tough enough to withstand the rigors of portability.



The Osborne Executive is an enhanced version of the first portable computer with a 7-inch screen and 128k of memory.

The Executive's internal changes are even more extensive than its external modifications. The unit, still Z80A-based, will come standard with 128k of RAM in a bank-switched configuration. The communications abilities of the machine have been considerably augmented. The Executive will have a full RS-232-C port with synchronous capabilities, as well as a bidirectional parallel port that is closer to IEEE specifications than its predecessor. To utilize these expanded abilities, a 3270 terminal emulator is available immediately, with a variety of others to come. Two other internal changes are of interest: The main memory is located on a piggyback printed circuit board, providing nearly 4Mb of bank-switched memory. And the Executive addresses the cooling question with a new thermocoupler-controlled fan that varies the air flow according to environmental needs.

The standard operating system on the Executive will be CP/M+, which provides markedly faster disk input and output. The Executive will also include new documentation, which the company says is smaller, less imposing, and more accessible than the original Osborne manuals. At some point in the fall, a new modem will be offered, with the same compact slip-in housing as the current Osborne modem, but with 300- and 1200-baud capabilities.

One interesting feature of the new Osborne is that its character set is "writable"—a program is available allowing the user to modify the appearance of the individual fonts. There are two 128-character sets that come with the Executive, one containing graphics characters similar to those found on the TRS-80. To modify characters, the user calls up the Character Editing Menu and selects the character to edit, which then appears as a single large character made up of asterisks. Menu commands allow the user to add or delete rows or columns of asterisks, which in turn alters the shape of the actual small character in memory.

Users will probably find that the Executive addresses almost all the minor and major difficulties of the Osborne 1, from cooling to printer interfaces, as well as offering more depth and utility in its functions. Of course these upgrades are reflected in the price; with a full complement of software (WordStar, MailMerge, SuperCalc, CBASIC, MBASIC, UCSD-p, and a new data-base manager called Executive Data Base), the Executive will list at $2495. The Osborne 1, by the way, will continue to be available, and company representatives hasten to add that the new machine is not intended as a replacement for that model.

That, however, is not the whole Osborne story this month. At the same time the Executive was announced, an enhanced version was announced as well. This enhancement will be the long-rumored IBM-compatible version, which will be achieved by adding an 8088 co-microprocessor to the existing Z80A-based unit. The enhanced version of the Executive will run both MS-DOS 2.0 and CP/M-86. It will contain an additional graphics board, to provide graphics compatibility (in monochrome) with IBM software (adding, for example, a 25th line to the display).

The price of the enhanced Executive will run between $2995 and $3195. At some point in the future, the 8088 microprocessor will be offered as an upgrade on existing Executives.

FOR MORE INFORMATION: OSBORNE COMPUTER CORPORATION, 26500 Corporate Ave., Hayward, CA 94545; (800) 227-1516, in California (800) 772-3545.
CIRCLE 456

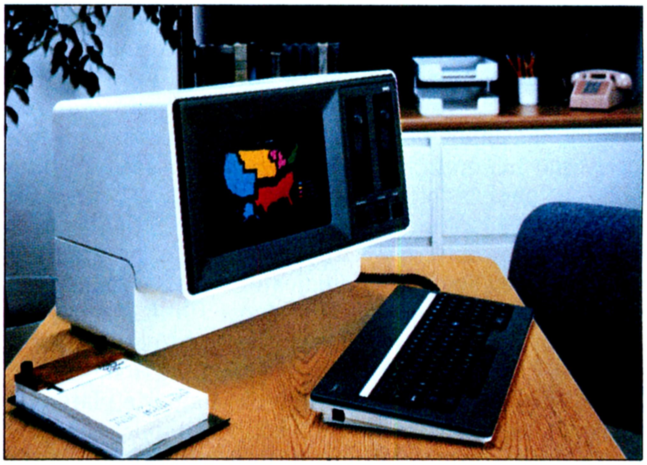
—Michael Rogers, Senior Editor

NCR ENTERS PERSONAL COMPUTER MARKET WITH AN EXPANDABLE SYSTEM

Options for NCR's new Decision Mate V personal computer allow this machine to expand from an economical bread-and-butter computer priced at $2800, to an advanced dual-processor system with high-resolution color and graphics starting at $3400. Both systems are based on the same machine.

The basic Decision Mate model contains 64k of RAM which is expandable to 512k; two 320k floppy disk drives (a 10Mb hard disk drive can be substituted for one of the floppy disk drives); seven expansion slots; and a high-resolution green display screen.

A high-end model can be fitted with a color or monochrome green CRT. Both CRTs have anti-glare coatings, show 80 characters on 24 lines, and 640 by 400 dot graphics which can be fully intermixed with text. A second processor in the high-end model enables it to run CP/M-86 and MS-DOS-based software, as well as CP/M programs. Dealers can retrofit the base model with this second processor; however, the color CRT cannot be added after purchase.



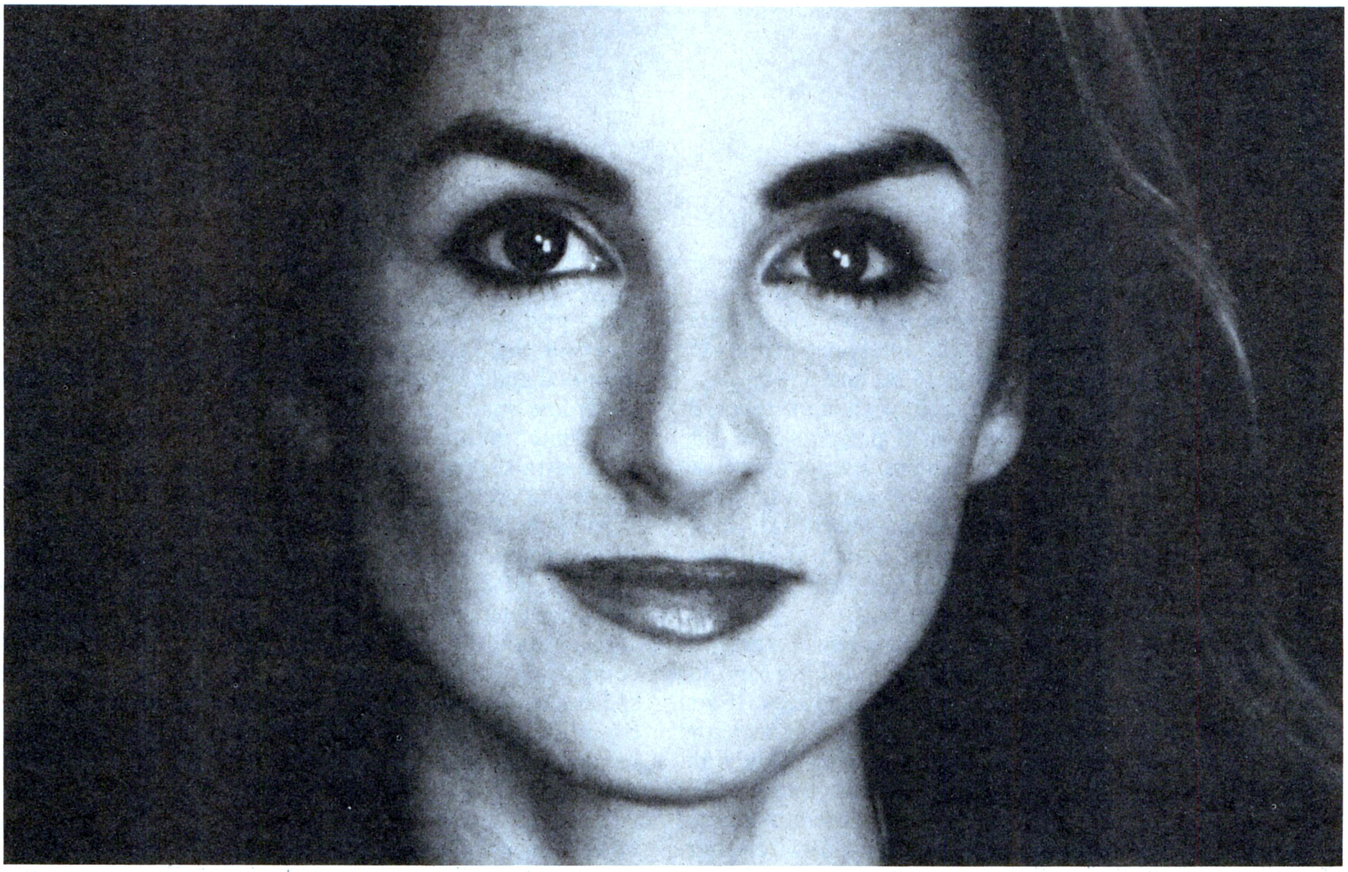
The basic NCR Decision Mate V contains two floppy drives, seven expansion slots, and a high-resolution screen.

Like most computers with outstanding graphics capability (which you get with or without the color option), the NCR uses a separate processor—with its own RAM—to run the display. This speeds the overall system, since the main processor doesn't get tied up in managing the complexities of the color graphic display. We found the color display to be as sharp as the monochrome screen. It's even suitable for word processing.

The Decision Mate comes with an Atari joystick-compatible port on the side of the keyboard. NCR officials were quick to point out that the port could also accommodate a "mouse" like the one on Apple's LISA.

NCR is also encouraging other firms to make or adapt compatible hardware and software products for the Decision Mate machines. To foster this process, all Decision Mates use the CP/M operating system. Higher-priced models use operating systems that run on the IBM Personal Computer as well.

When you decide to plug in printers, modems, more memory, etc., you're in for a nice surprise. You don't have to unscrew, unsnap, or pry off anything. A box-like cavity in the rear of the machine contains the seven expansion



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slots. Expansion devices, like printer ports, are all contained in plastic cartridges that you simply pop in and out. Memory cartridges come in 64k, 192k, and 256k.

The Decision Mate is supplied with a number of function-key labels. Before running a program you slide the appropriate key label template into its slot above the 20 programmable function keys. NCR offers a template with each of its initial seven programs—WordStar, SpellStar, MailMerge, InfoStar, DataStar, CalcStar (all from MicroPro International of San Rafael, Calif.), and SuperCalc (from Sorcim of San Jose, Calif.).

NCR paid a lot of attention to ergonomics when designing the Decision Mate. Each time you hit a key, for example, the computer provides audible feedback. If you don't want or need this feature you can turn the sound down or off using the speaker control in back of the unit.

The keyboard has a very soft feel, with unusual key shapes and positions. All keys have auto-repeat, and a set of small switches under the keyboard lets you switch character sets to six foreign languages.

IBM Personal Computers, Apple ///s, and NCR Decision Mates can be combined in networks of up to 64 machines, using an adaptation of the Corvus Omninet.

The base model Decision Mate costs $2800 complete with CP/M and a "hidden" feature found in few other computers: NCR's customer hotline, which is available from 8 a.m. to 5 p.m. (your time zone) anywhere in the continental United States.

The dual-processor version of the Decision Mate starts at $3340, and will be available in June. The color CRT costs $910. The 128k memory cartridge costs $350, the 256k unit is $900, and the 512k cartridge is priced at $1950. A parallel or serial printer interface cartridge adds $200 to $250 to the cost of the system.

FOR MORE INFORMATION: NCR CORP., Dayton, OH 45479.
CIRCLE 453

—Lee Thé, Associate Editor

COMPLETE PLUG-IN TELECOMPUTING PACKAGE FOR THE IBM PERSONAL COMPUTER

Ven-Tel believes that the typical IBM Personal Computer owner is looking for solutions that are both powerful and easy to implement. So this maker of high-speed modems for Fortune 1000 firms has entered the personal-computing world with a one-step telecomputing package.

Ven-Tel's PCmodem includes a plug-in modem card, cable, and Crosstalk, a sophisticated telecomputing program that's been customized for the PCmodem. All you need is an IBM Personal Computer and a phone company modular wall outlet, with or without a telephone. The package includes a second cable so you can still use a phone with that outlet. And the modem card includes a serial port so you can still run a printer from the expansion slot the PCmodem occupies. The modem includes auto-dial and auto-answer capabilities—you can use it for electronic mail (unattended file transmission between electronic "mailboxes")—although that's not a capability of Crosstalk. And this medium-speed modem can be expanded to include high-speed capabilities.

Modems are classified by compatibility to certain Bell system protocols. The PCmodem is Bell 103-compatible. That's a 300-baud speed protocol corresponding to about 300 characters per minute. You can plug a piggyback card onto the PCmodem card that adds full Bell 212A-compatible operation at up to 1200 baud—the highest speed you can use with information utilities like The Source and CompuServe. But unlike most 212A-compatible modems, you don't have to add the 1200-baud module until you need it.

It would be hard to imagine a simpler way to turn an IBM Personal Computer into a telecomputer. You slide back the case on the IBM and place the PCmodem card into any of the expansion slots, plug a little wire into the IBM's speaker assembly, attach the phone cable(s), plug the printer into the card, and close the case. Then pop the cable into the wall outlet, attach a phone if you want to, put the Crosstalk diskette into the IBM—and go.

The preconfigured program lets you use your IBM as a smart mainframe terminal, and to transfer error-checked files between any two computers with Crosstalk software. Crosstalk can transfer error-corrected files between any mix of both PC-DOS and CP/M-based systems. You can store complete sets of communications protocols for the different computers and information utilities you deal with, and then have the system automatically engage the right protocol when you select the appropriate phone number from the directory you build in Crosstalk.

Dialing is especially easy, because the Ven-Tel can do speedy touch-tone dialing as well as the slower pulse-type. If you forget how to do something in the program, a HELP function can refresh you on the command structure. Also, auto log-on lets you automate complicated dial-in procedures for utilities like Sprint, MCI, The Source, CompuServe, etc. The same facility makes it simple to log onto mainframe computers. Thus, two impediments to easy telecomputing—protocol differences and log-on problems—are overcome. Because you're connected to the IBM's speaker, you can hear when you get a busy signal. That saves the time spent with many modems waiting to see if your call is going to connect.

The PCmodem works with just about any other telecomputing software for the IBM Personal Computer, giving it great versatility. If you decide to add the 1200-baud option, just open the IBM's case and plug the module onto the card. That way you still only use one of the IBM's four expansion slots.

At $389 for the complete 300-baud package, you get everything you need—not just for telecomputing, but for verified file transmissions (even between different computers as long as they use CP/M or MS-DOS operating systems), electronic-mail capabilities, auto-dial, auto-answer, and auto-log. In our demonstration, the 300-baud system worked flawlessly (the 1200-baud option should be ready as you read this). Ven-Tel has entered the consumer marketplace with a state-of-the-art system that's also easy for the neophyte to master.

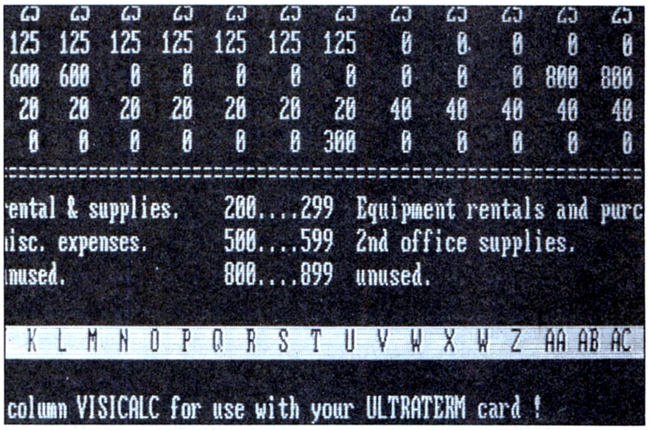
FOR MORE INFORMATION: VEN-TEL INC., 2342 Walsh Ave., Santa Clara, CA 95051; (408) 727-5721.

CIRCLE 473

—Lee Thé, Associate Editor

VIDEO BOARD OFFERS BOTH SPREADSHEET AND WORD-PROCESSING DISPLAYS

Videx of Corvallis, Oregon, has just released an Apple expansion board, the Videx Ultraterm, which greatly augments the power of both VisiCalc and word processing for the Apple //e, the Apple II Plus, and the Apple ///. The board opens the VisiCalc window to make it 128



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For spreadsheeting the Ultraterm card will display in either 128 by 32 line, 132 by 24 or 160 by 24 formats..

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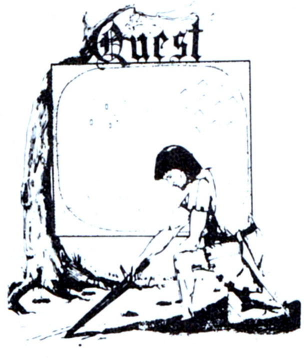

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32K TRS 80 COLOR Version $24.95.
Adds a second level with dungeons and more Questing.

BASIC THAT ZOOOMMS!!
AT LAST AN AFFORDABLE COMPILER!
The compiler allows you to write your programs in easy BASIC and then automatically generates a machine code equivalent that runs 50 to 150 times faster.
It does have some limitations. It takes at least 8k of RAM to run the compiler and it does only support a subset of BASIC—about 20 commands including FOR, NEXT, END, GOSUB, GOTO, IF, THEN, RETURN, END, PRINT, STOP, USR (X), PEEK, POKE, *, /, +, -, >, <, =, VARIABLE NAMES A-Z, SUBSCRIPTED VARIABLES, and INTEGER NUMBERS FORM 0-64K.
TINY COMPILER is written in BASIC. It generates native, relocatable 6502 or 6809 code. It comes with a 20-page manual and can be modified or augmented by the user. $24.95 on tape or disk for OSI, TRS-80 Color, VIC 20, or Commodore 64.

SEAWOLFE — ALL MACHINE CODE In this high speed arcade game, you lay out patterns of torpedoes ahead of the attacking PT boats. Requires Joysticks, at least 13k RAM, and fast reflexes. Lots of Color and Sound. A fun game. Tape or Disk for Vic20, Commodore 64, and TRS-80 Color.
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Dealers — We have a line of about 100 original programs for the machines listed here. We have High speed Arcades, Quality Adventures, Word processors and Business Software for Small machines. Better yet, we have excellent Dealer support. Phone for information.

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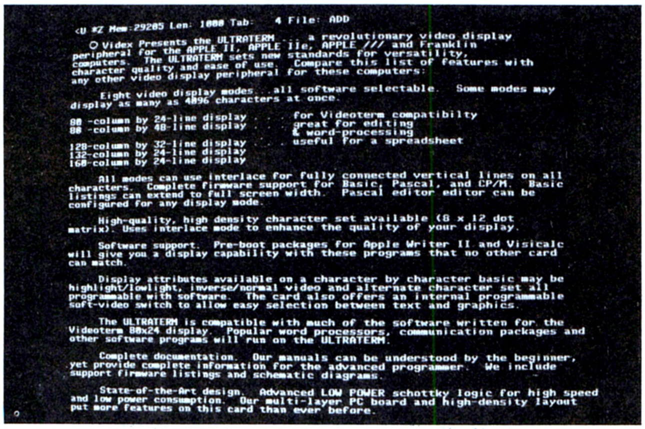
columns wide and 32 rows deep and expands the word-processing windows to 80 columns wide by 48 columns long. The current standard screen size is 80 by 24. While some word processors are already equipped to support the Ultraterm, many programs will have to be updated to take into account the wider window.

We saw the Ultraterm demonstrated on an Apple //e with the Apple /// monitor. The Apple /// monitor is one of the two monitors recommended by Videx for its expansion card, the other being the Amdek Video 310A amber monitor. Whichever monitor is chosen—and others will also fit the bill—it must be a CRT with a high- or medium-persistence phosphor.

Perhaps the most impressive achievement of the Ultraterm expansion board is that the character set it produces is so sharp that it's difficult to see the dots that make up each character. The sharp images are produced by using a display technique called interlace. The way the technique works explains why a low-persistence phosphor CRT cannot be used with the board. Interlace controls so many phosphor locations at one time during the display that they can't be refreshed quickly enough for vibration not to show on a low-persistence phosphor monitor.



```
<U #Z Mem:29205 Len: 1000 Tab:   4 File: ADD

   O Videx Presents the ULTRATERM ... a revolutionary video display
peripheral for the APPLE II, APPLE IIe, APPLE /// and Franklin
computers.  The ULTRATERM sets new standards for versatility,
character quality and ease of use.  Compare this list of features with
any other video display peripheral for these computers:

     Eight video display modes...all software selectable.  Some modes may
display as many as 4096 characters at once.

80 -column by 24-line display . . .  for Videoterm compatibilty
80 -column by 48-line display . . .  great for editing
                                     & word-processing
128-column by 32-line display . . .  useful for a spreadsheet
132-column by 24-line display
160-column by 24-line display

     All modes can use interlace for fully connected vertical lines on all
characters.  Complete firmware support for Basic, Pascal, and CP/M.  Basic
listings can extend to full screen width.  Pascal editor editor can be
configured for any display mode.

     High-quality, high density character set available (8 x 12 dot
matrix). Uses interlace mode to enhance the quality of your display.

     Software support.  Pre-boot packages for Apple Writer II and Visicalc
will give you a display capability with these programs that no other card
can match.

     Display attributes available on a character by character basic may be
highlight/lowlight, inverse/normal video and alternate character set all
programmable with software.  The card also offers an internal programmable
soft-video switch to allow easy selection between text and graphics.

     The ULTRATERM is compatible with much of the software written for the
Videoterm 80x24 display.  Popular word processors, communication packages and
other software programs will run on the ULTRATERM.

     Complete documentation.  Our manuals can be understood by the beginner,
yet provide complete information for the advanced programmer.  We include
support firmware listings and schematic diagrams.

     State-of-the-Art design.  Advanced LOW POWER schottky logic for high speed
and low power consumption.  Our multi-layer PC board and high-density layout
put more features on this card than ever before.
```

The Videx Ultraterm offers an 80-column by 48-line display for word processing on Apple and Franklin computers.

Scrolling works smoothly. Moreover, the board gives you keyboard control of several intensity levels on the display, including two levels of intensity for inverse displays (dark characters on a bright background).

When we saw the Ultraterm, Videx demonstrated it with WordStar and VisiCalc. WordStar, though, can be configured for the display in the software's current format. VisiCalc requires using an Ultraterm 128-column pre-boot disk that Videx provides. Videx claims that unprotected CP/M and Pascal software can generally be configured by the user for Ultraterm, but that other packages will probably need to be updated to use this device.

Videx's Ultraterm works on the Apple //e, the Apple ///, the Apple II Plus and the Franklin 1000 using the Apple /// monitor. Videx claims that the Ultraterm consumes a reasonably low amount of power, despite its capabilities. At the time of writing price had not been determined, but Ultraterm is expected to cost in the $300 range.

FOR MORE INFORMATION: VIDEX INC., 897 N.W. Grant Ave., Corvallis, OR 97330; (503) 758-0521.
CIRCLE 551

—Lee Thé, Associate Editor

NEW RADIO SHACK MODEL 12: VERSATILE COMPUTER FOR GROWING BUSINESSES

The Radio Shack Model 12 will appeal to professionals with moderate current needs—and unlimited ambition for future expansion. It's especially timely for those who aren't sure just how they'll want to expand later, because it can grow into either a multicomputer network or a multiuser 16-bit system with satellite terminals. A thorough upgrade of previous machines, the Model 12 seems destined to become Tandy Corporation's flagship computer.

The Model 12 comes with a Z80 8-bit processor; a built-in, 1.25Mb 8-inch floppy-disk drive; a detachable 82-key keyboard; a green phosphor 12-inch display; 80k of RAM with 64k available for programs and user data; three peripheral ports; a port for additional floppy drives; and the latest TRSDOS 4.2 operating system.

Everything about this computer is big. It takes up a 28-inch by 21-inch desk top, but its sleek styling makes it look smaller. The low-profile keyboard includes a 10-key pad and eight programmable function keys. The computer has its SHIFT and RETURN keys where Selectric-trained hands expect to find them, and all keys have a non-slip matte finish. You can turn off the electronic keyclick sound if you wish. In addition to alphanumerics, you can enter graphics composed from 32 basic shapes, using the keyboard.

It's easy to read the green screen's 80-character by 24-line display unless you have glare where you work. If this is the case, however, you can buy a Radio Shack polarized glass add-on panel ($30) to take care of high-glare situations. Unlike the less expensive black nylon mesh panels, the glass screen does not reduce resolution.

Plug in a printer—and maybe a modem—and you're in business. The basic Model 12 should keep most buyers happy for quite a while, especially if they opt for a second drive. But if the basic capabilities are all you'll ever need, there are less expensive computers to consider. The best feature of the Model 12 is its enormous expandability. The Model 12 gives you the option of creating a large-storage, 8-bit system with high-resolution graphics, or a 16-bit, large-RAM multiuser system.

In the single-user path, you could start by adding the

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never see our syst

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I saw. I don't know how
for that price."

"Now that I've used it f
awhile, I see why you name
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And that from bus ssmen
who have tested t etition!
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understand why, af e
others, all of these bu
picked NEC.

Our business software was optimized to take advantage of the APC's unique hardware features. That makes system operation faster and easier.

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Our high-resolution color graphics run circles, arcs and lines around everybody else.
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line characters
pi are unprecedented
in their clarity.
colors against resolution
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combines a
black high-res
128K bytes of u
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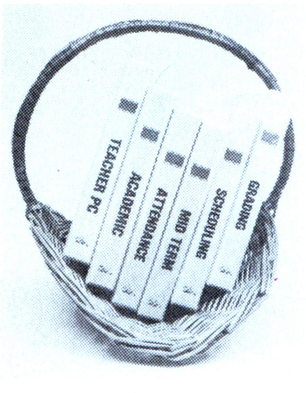

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Yucca Valley, Ca. 92284

CIRCLE 90

The cream of the personal computing crop —3 new titles from Prentice-Hall cover the latest in personal computing topics.

UCSD Pascal Handbook: A Reference and Guidebook for Programmers
Randy Clark and Stephen Koehler, both of SofTech Microsystems, Inc.
Offers you the only complete and unified description of UCSD Pascal—*especially appropriate for microcomputers,* with full reference to the UCSD Pascal language and a programmer's guide. 1982, 356 pp., paper, $15.95

Personal Computing with the UCSD p-System
Mark Overgaard, Stan Stringfellow, both of SofTech Microsystems, Inc.
A thorough introduction to the UCSD p-System, this new book addresses a topic not covered in most programming texts—the specific details of entering a program and preparing it for use. 1983, 400 pp., paper, $16.95

Microcomputer Graphics
Donald Hearn, M. Pauline Baker, both of Western Illinois University
Provides you with a total introduction to microcomputer methods with thorough attention to special effects and three-dimensional graphics. 1983, 320 pp., paper, $18.95

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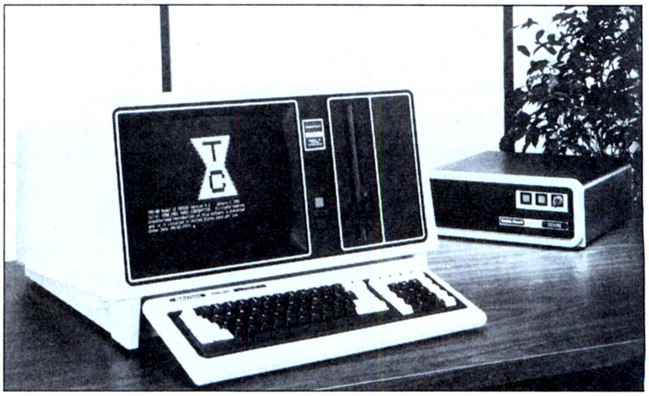
CIRCLE 91

$250 CP/M Plus operating system, opening the door to one of the world's largest assemblages of professional software. The next logical expansion step would be to have your dealer install the expansion card cage (for about $230) inside the Model 12, behind a panel fastened with thumbscrews. After that, most peripheral cards can be installed simply by opening the lid and plugging the card into the slot. Then you can add a memory card (from $400 for the 64k card), which you need in order to run large CP/M programs. This is necessary because even though the machine has 80k of RAM, TRSDOS occupies 16k of that at all times, and CP/M Plus takes up more RAM than CP/M 2.2 did. So CP/M 2.2 applications software may run out of room unless you add RAM. The memory card also gives you huge VisiCalc files (running in TRSDOS).

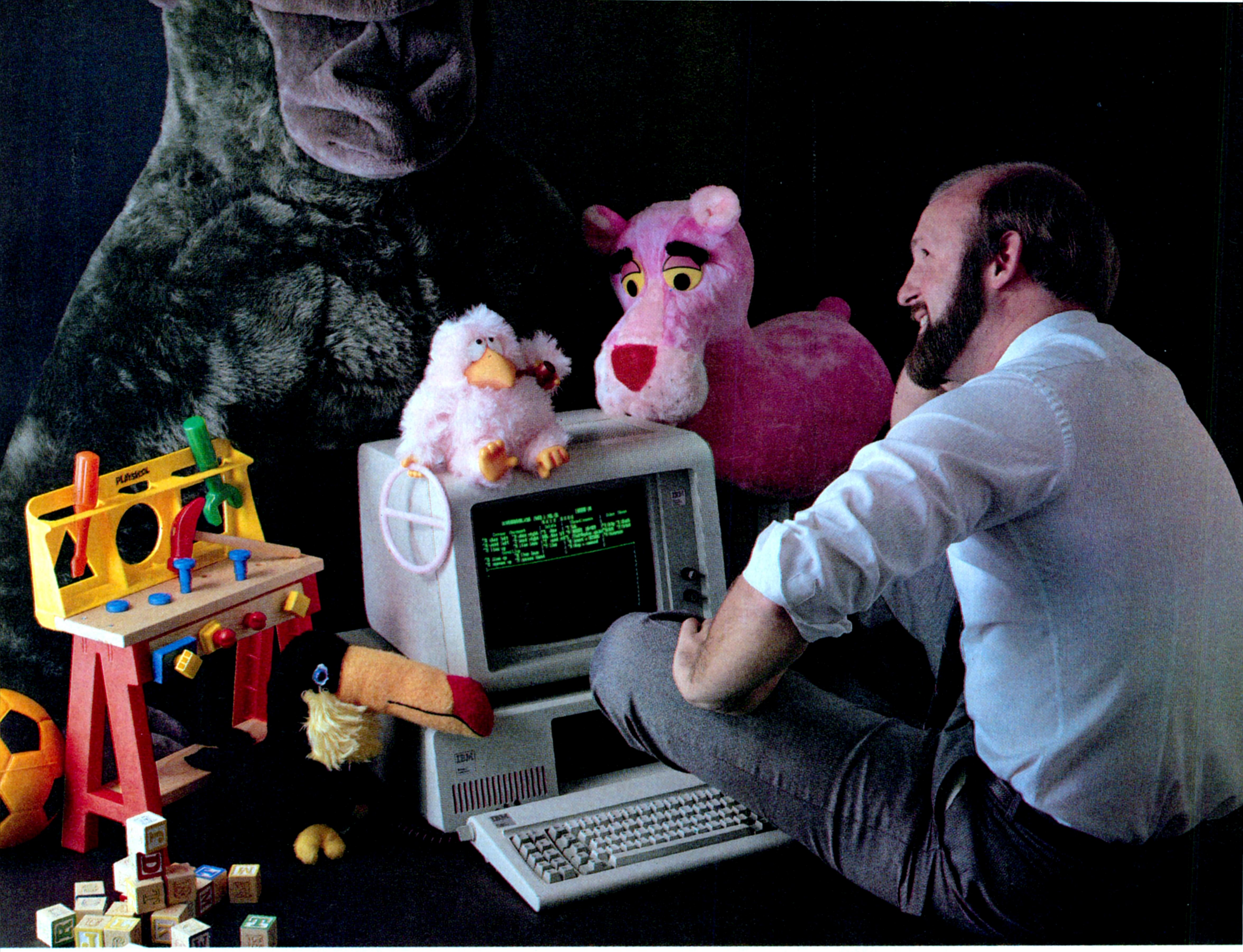


The Radio Shack Model 12 can be expanded into either a multi-computer network or a 16-bit multiuser system.

Once the card cage is installed along with CP/M and some more RAM, the next logical step is the 12Mb hard disk drive for $3500. Later you can plug as many as three more drives into the first, for $2500 each. These drives don't mix with the older 8Mb units, by the way. The system can also be expanded to two internal and two external 8-inch floppies for up to 5Mb total storage. However, disk access time would be up to 10 times slower, and the ability to store very large files would be restricted to the 1.25Mb floppy unit.

A high-resolution graphics board that only works with the 8-bit processor is a further option at $1500.

If you decide to expand to a 16-bit multiuser system, you start with the same basic system, then add the 16-bit processor and the 128k memory kit ($1500 total). The memory board can be expanded to 256k with a $500 memory set you can install yourself. Additional 128k boards cost $700 and are expandable. The Model 12 can take up to 1Mb of RAM, though Radio Shack predicts most users will stop at two or three 256k boards and put the other expansion slots to different uses. Many users



This Programming professional deserves a lot more from his personal computer.

He's earned it. As a seasoned professional, he's learned to master some of the world's most advanced programming tools. Tools specially designed to meet the everyday demands of programming experts.

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Prior to the announcement of micro/SPF™ development software, experienced programmers felt programming a personal computer was a lot like playing with a toy. You couldn't take it seriously.

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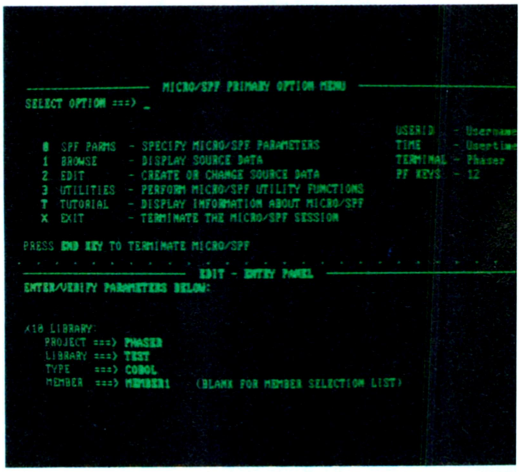
In addition, micro/SPF™ comes equipped with the same primary and line commands, tutorial messages and program editor (with program function keys) experienced programmers are used to.

Programming professionals who've spent years perfecting the art of writing sophisticated code deserve to work with state-of-the-art tools, not toys. Find out how micro/SPF™ can help you do work-compatible programming on your personal computer today!



```
------------- MICRO/SPF PRIMARY OPTION MENU ----------------
SELECT OPTION ===> _

                                                      USERID   - Usernam
  0  SPF PARMS  - SPECIFY MICRO/SPF PARAMETERS        TIME     - Usertim
  1  BROWSE     - DISPLAY SOURCE DATA                 TERMINAL - Phaser
  2  EDIT       - CREATE OR CHANGE SOURCE DATA        PF KEYS  - 12
  3  UTILITIES  - PERFORM MICRO/SPF UTILITY FUNCTIONS
  T  TUTORIAL   - DISPLAY INFORMATION ABOUT MICRO/SPF
  X  EXIT       - TERMINATE THE MICRO/SPF SESSION

PRESS END KEY TO TERMINATE MICRO/SPF
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
---------------------- EDIT - ENTRY PANEL -------------------
ENTER/VERIFY PARAMETERS BELOW:


X10 LIBRARY:
   PROJECT ===> PHASER
   LIBRARY ===> TEST
   TYPE    ===> COBOL
   MEMBER  ===> MEMBER1    (BLANK FOR MEMBER SELECTION LIST)
```

PHASER

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SAN JOSE, CA 95110

would get a hard disk or two at this point. Finally, you'd add two Radio Shack $700 terminals. Such a setup, with the Xenix operating system, could run applications programs on the three workstations independent of each other. The terminals lack the Model 12's programmable function keys, so software may need to be able to use both function keys and control keys on such a system.

One benefit, of course, is that you can buy a Model 12 and defer choosing between these two courses of action until later, preserving your options. The Model 12 starts at $3200 with one floppy drive and $4000 with two.

FOR MORE INFORMATION: RADIO SHACK, 1800 One Tandy Center, Fort Worth, TX 76102, or contact your local Radio Shack store or computer center.

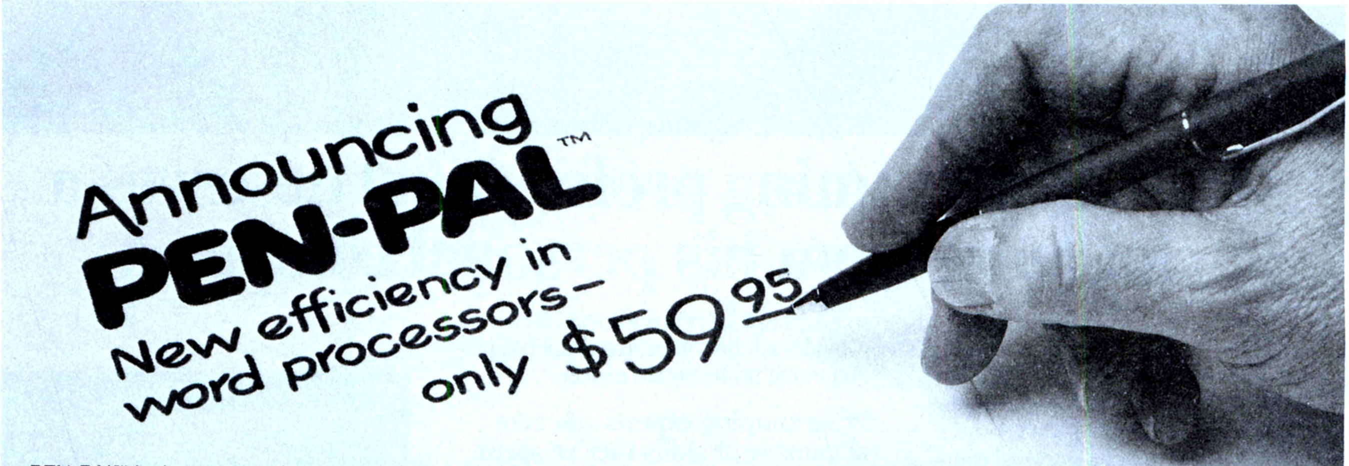
—Lee Thé, Associate Editor

TRACE SOUND TRAP FOR DOT-MATRIX PRINTERS REDUCES NOISE, HELPS ORGANIZE DESK

For many people, the single most annoying feature of personal computing is the sound of a dot-matrix printer at work. In the past, printer enclosures have cost almost as much as the printers themselves and have taken up as much space as all the other parts of the system put together. Now Trace, a Mountain View, Calif. engineering design firm, offers its Sound Trap as an affordable solution to the noise problem.

The Sound Trap wraps neatly around most 80-column dot-matrix printers. After you place the printer in the Sound Trap, you have to guide the power and connecting cable out through slots in the back, feed your paper in through the rear slot, and roll enough of it through the printer so the printout emerges from the same slot. This took us about 10 minutes, ignoring the illustrated manual and just doing what seemed reasonable. The stand plugs into four small slots in back which are all sound-insulated. It tilts the printer up at an angle of about 40 degrees, and its lid has a lip so you can put your work on it.

This is great ergonomically—you can place your work so you don't have to refocus your eyes whenever you go back and forth between your work and the screen. You



PEN-PAL™ is the new word processor that maximizes your output. For home or business PEN-PAL gives you the flexibility you need to do all of your writing. From memos to manuscripts, from reports to recipes you produce professional results.

At $59.95 PEN-PAL is your best buy. Functions found in more expensive word processors can be found in PEN-PAL — like:

- 5 help "menus" for display
- Horizontal scroll to 254 characters
- 40 and 80 column formatting
- Automatic page numbering and heading
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- Block copy moves, store and delete
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- Accepts 16K RAM card to increase file storage
- 2 display modes (editing and formatting)
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- Takes advantage of Apple IIe® new features (upper/lower case, arrow keys, delete, etc.)

For efficiency, economy and performance buy PEN-PAL. Only $59.95 at your local software retailer or call 800-428-3696 and reference Ad SW101. In Indiana call (317) 298-5400.

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CIRCLE 92

might think it would all spill when you lifted the Sound Trap's lid to get at your printer's controls. Not so. Trace cleverly placed another lip at the top of the lid to keep your work from sliding off when you lift it up. Traditionalists can place the stand so the enclosed printer is horizontal, but this wastes space relative to the tilt-up position.

Does the Sound Trap work? You bet. That nasty clatter is dulled to a bearable rustle, and the paper feed works fine. In fact, the tilt stand leaves room behind and under the printer for a fair-size stack of paper. There's only one problem: If you have a smooth wall right behind the Sound Trap, noise emerging from the paper slot will bounce right back at you. You can solve this by not placing it close to a smooth wall, or by altering the acoustic reflectivity of the wall. You can achieve the latter with drapes or acoustic tile or foam.

Sound Trap costs $129 with the stand, $109 without. At that price, it should be possible to figure out a reasonable amortization schedule based on your increased productivity (i.e., being able to think straight while printing). And if you have a system at home, you may find a Sound Trap will make a considerable contribution to domestic tranquility.

FOR MORE INFORMATION: TRACE, 1928 Old Middlefield Way, Mountain View, CA 94043; (415) 964-3115.
CIRCLE 494

—Lee Thé, Associate Editor

INTEGRATED PORTABLE COMPUTER SYSTEM

Access Matrix Corporation has introduced Access, a portable computer system that integrates several peripherals into one unit.

The system includes a Z80 microprocessor; a high-speed dot-matrix printer; a direct-connect modular telephone jack and internal modem; a 7-inch amber monitor; two double-density, 5¼-inch disk drives; a low profile, detachable keyboard; 64k of RAM; multiple I/O ports; storage compartment for 10 diskettes; and a leather case.

The built-in printer delivers hard copy at a rate of 80 characters per second. Users can print up to 132 characters per line on standard 8½-inch paper. The printer features a 96 ASCII character set, along with full graphic capabilities, and a program that allows various type styles to be printed.

Access can be configured for 110- or 220-volt operation. The optional internal battery pack is designed for total portability. This uninterruptible power source gives the user up to an hour of system operation and can be recharged from any household outlet or 12-volt battery. The retail price is $2495.

FOR MORE INFORMATION: ACCESS MATRIX CORPORATION, 2159 Bering Dr., San Jose, CA 95131; (408) 263-3660.
CIRCLE 450

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Our newest modem is based on just three USR-designed microprocessors—by far the lowest parts count of any 212A modem available. Its resulting simplicity promises two major benefits. The first is outstanding reliability—that not only stands to reason, it's backed by a two-year warranty. The second is a cost low enough to inspire skepticism. Be skeptical; shrewd comparisons may save you as much as $100. The shrewd modem. If it's not at your dealer's yet, write or call for complete specifications. 1053

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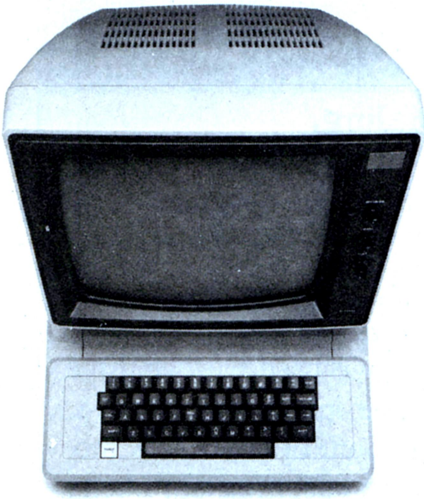
CIRCLE 83

IF YOU'RE CONFUSED PERSONAL COMPUTER,

At this moment, there are no less than 50 personal computers on the market. And more are being introduced every day.

On one hand, having all those options is a good thing. On the other, it can make picking the right one pretty difficult.



Computers come in two parts.
You have to buy both.

We'd like to help. So here are a few suggestions about how to buy the computer that's right for you.

Computers come in two parts.

One part is the "hardware," which is the machinery itself. The other is the "software," or a program, as it's sometimes called.

Software is the part that tells the computer what to do, the way a driver tells a car what to do.

Without software, a computer can't do anything.

And vice versa.

You have to buy both.

Buy the software first.

Since the reason you're buying a computer is to get the capability the software gives you (remember, it's the software that knows how to get things done), it makes good sense to pick the software first.

Start by making a list of the things you want to use the computer for. It can include almost anything—any kind of inventory, filing, accounting, graphics, reporting, record-keeping, analysis—you name it and there's probably a software program that does it.

Next, take the list into a computer store and ask the salesperson to give you a demonstration of the program, or programs, that will do the things you want.

Even though you'll need a computer for the software demonstration, keep in mind the computer is just a vehicle. The software is the driver. And once you've decided on the software, picking out the rest of the computer system will be much easier.

The simpler the better.

Look for software that's easy to learn, easy to use, and that does the job in the simplest way possible.

Good personal software should be, as the computer people say, "friendly." Meaning that it helps you do what you have to do without getting in the way.

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Meaning there are no complicated routines to follow to perform a simple task. And no programming language to learn.

Some people, however, will tell you that software has to be complicated to be powerful.

Nothing could be farther from the truth.

Because in order for a program to appear simple to you on the outside, it has to be extremely complex on the inside.

ABOUT BUYING A
HERE'S SOME HELP.

Good software keeps the complications in the computer, where they belong. And keeps the capability at your fingertips. It's that simple.

You simply have to see for yourself.

You can read any number of interesting books and magazines about personal computers. You can ask friends who have them. You can look at all the sales literature you can get your hands on. And you should do all those things before you decide to buy.

But as helpful as all that can be, there really is no substitute for a real, live demonstration.

When you do go out shopping, we recommend you take a look at the PFS® Family of Software.

The PFS family is designed the way we think all software should be: simple, straightforward and powerful.

Currently, three products make up the family. PFS:FILE, PFS:REPORT and PFS:GRAPH, with more programs on the way. Here's a little more about each of them.

PFS:FILE. The simplest way to get organized.

Basically, FILE works like a paper filing system, without the paper. So you can record, file, retrieve and review information in a fraction of the time it takes with a conventional filing system.

FILE lets you arrange your information in "forms" you design yourself. So you can get at and really use your information in ways never before possible.

What's more, FILE lets you change the original form without having to redo the information on it.

PFS:REPORT. Making the most of your information.

REPORT summarizes the information on your forms so you can use it to analyze, plan and make better-informed decisions.

With REPORT, you get presentation-quality reports—sorted, calculated, formatted and printed—automatically, in seconds.

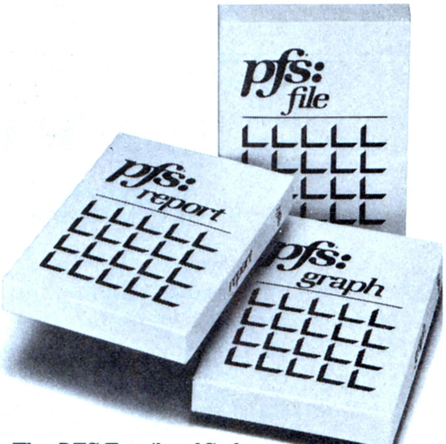
PFS:GRAPH. Instant pictures.

GRAPH gives you presentation quality bar charts, line graphs, and pie charts, in black and white or color, on paper or the computer screen. To get a clearer picture of things and spot trends instantly, you simply enter your information and specify the kind of graph or chart you want. GRAPH does the rest.

You can also mix and match line and bar graphs, or even stack or compare up to four bar graphs simultaneously.

And GRAPH will work with PFS:FILE, VisiCalc® files, or data entered directly into the computer.

Best of all, compared to the cost of hand-drawn graphics, GRAPH can save you enough money over the course of a few months to pay for the computer it runs on.



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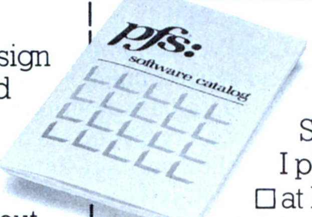

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CIRCLE 94

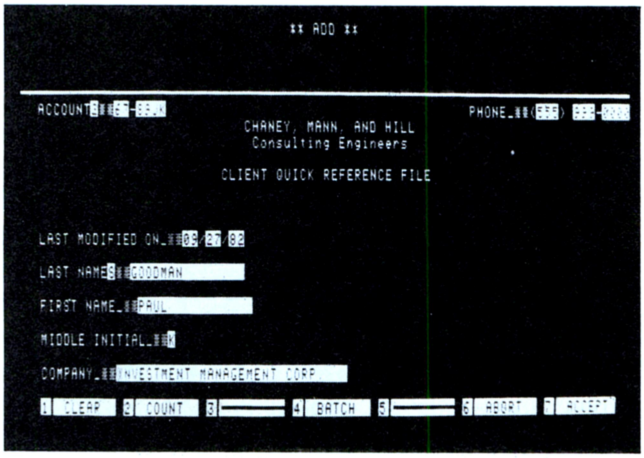
Software Packages For Home And Office Applications

Each month Personal Computing *scans the software market to keep you up to date on everything that's new. Those products we consider to be most useful and exciting in this month's crop are described in this section and commended for your closer examination. Others are listed in Showcase of Products, our special subscriber section.*

HEWLETT-PACKARD ENHANCES HP-86/87 WITH FILE-MANAGEMENT AND WORD-PROCESSING

People have recognized the Hewlett-Packard HP-86/87 computers as well-crafted machines just waiting for broadly applicable software. CP/M-based packages have been available, but they required plugging a $500 cartridge into the computer. Now four packages have been custom tailored to the HP's microprocessor and keyboard: the Peachtree Series 8 accounting programs, VisiCalc PLUS (i.e., plus graphics), and two products unique to HP—Word/80 and File/80.

Word/80 and File/80 were both designed for the businessman or manager who needs easy-to-use word-processing and file-management programs that give professional performance. The idea was to provide 80 percent of the performance of the most sophisticated programs, at 20 percent of the difficulty. This philosophy becomes evident as soon as you load either program into memory, because Word/80 and File/80 both make use of the HP's seven programmable function keys.



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File 80, for the HP 86/87 computers, is a sophisticated data base that holds up to 65,000 records on a hard disk.

Any time you're using Word/80 or File/80 you'll see a row of command designations marching across the bottom of your screen, just above the row of matching function keys. As you move from function to function (editing to printing, file "card" creation to search mode), the key designations change. So in effect you get more than seven function keys. This is much more flexible than systems with the function keys clustered to one side, a configuration which prevents easy on-screen labeling. It also works better than plastic function key designation strips slid into keyboard slots, because those don't allow the designations to change as you move around in your program.

File/80 lets you create data bases, starting with designing the forms you want to use. You have the flexibility to update records, restructure files without having to re-enter the data, do multicondition searches, and sort outputs. Results can be printed, stored on disk, or displayed on-screen. The report generation enables you to print out whole data bases, do averages, subtotals, grand totals, mini/max values, and four-function calculations.

Your data bases can hold up to 65,000 records. Each record can be up to 80 columns wide and 60 lines long. Reports can be formatted up to 132 columns wide. Each record can contain up to 100 informational categories, and each of these items can comprise up to 1028 characters. A single floppy disk can hold a data base of around 1000 200-character records. If you use the Hewlett-Packard 5Mb hard disk drive for storage, you can store from 857 to 65,000 records, with up to 76 characters of headings and 5828 characters of data in each record. A form letter format allows letters as big as the maximum record: 80 columns by 60 lines. The program can also generate labels.

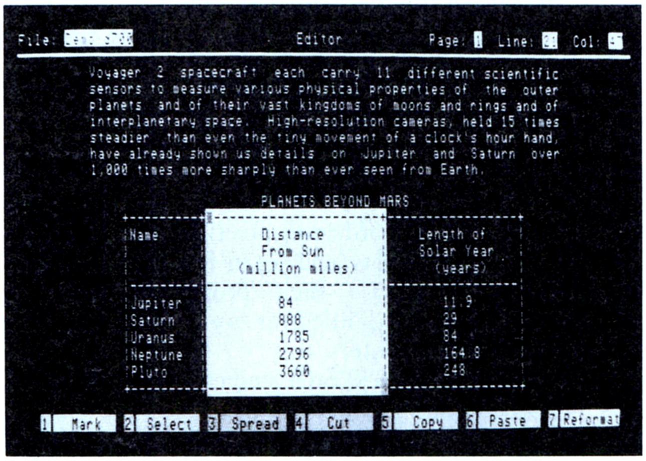
Setting up a data base with File/80 is straightforward. First you make backup copies of all five program diskettes (roughly, 1: creating forms/records; 2: editing; 3: printing; 4: disk utilities; and 5: a demonstration disk). Once you've been through the demonstration disk, you're ready to start building your first data base.

Data-base programs tend to be either freeform or fill-in types. Freeform data bases are easy to create, as the name implies, but they limit your ability to sort your data later on. Fill-in types require you to create a master form for each data base, but allow you to sort your output later on. It's also simple to enter data into any given record thereafter, and to review records, since you've entered the data in an organized fashion. You can change forms later on without having to re-enter data.

Searches, sorts, editing, and printing are all simple to control from the bottom-of-screen menus. Searches allow you to specify the degree of precision you want, and a variety of conditions—things like "greater-than," "less-than-or-equal-to." Printing is simple because everything is preconfigured—the Epson-derived printer carries the HP nameplate and works right out of the box. Once you've learned the system, a 27-page pocket guide is really all you need for reference.

Word/80, File/80's companion (though file-incompatible) program, has some outstanding virtues of its own. The dynamic function key labeling makes it easy to create and edit text.

File size goes up to 170 pages of text in memory, because Word/80 can address the HP 86/87's considerable memory expansion capability. Each disk can hold up to about 85 pages of text. Graphics—one of Hewlett-Packard's hallmarks—shows up here: You can merge charts and graphs into text. This function requires installation of a plotter ROM in your computer. Also, on-screen text justification lets you preview your printed output.



Voyager 2 spacecraft each carry 11 different scientific sensors to measure various physical properties of the outer planets and of their vast kingdoms of moons and rings and of interplanetary space. High-resolution cameras, held 15 times steadier than even the tiny movement of a clock's hour hand, have already shown us details on Jupiter and Saturn over 1,000 times more sharply than ever seen from Earth.

PLANETS BEYOND MARS

Name	Distance From Sun (million miles)	Length of Solar Year (years)
Jupiter	84	11.9
Saturn	888	29
Uranus	1785	84
Neptune	2796	164.8
Pluto	3660	248

Word 80, because it can address the HP 86/87's significant memory expansion, can store 170 pages of text in RAM.

You can format text in two ways. While you're editing text, you can imbed any of 46 commands to control print output, or you can go through a menu-driven process in the format module to organize your text for printing. People who write a lot prefer imbedded commands (like .pp—format a standard paragraph block), because they allow heavy editing without requiring text reformatting every time a change is made. They also let you set up formats for form letters and the like, so you can do word processing without having to reinvent the wheel each time.

Word/80 and File/80 both allow very sophisticated use. Fortunately for beginners, their integration with the hardware and on-screen menus allows newcomers to write and file without having to master all the computing jargon beforehand. HP also offers single-vendor responsibility to a degree that's rare with personal computers. And if you get really bogged down, HP is instituting user hotlines during business hours to get you over the humps.

Word/80 and File/80 each cost $250. Hewlett-Packard has also been offering the two packages bundled with other software at a discount price.

FOR MORE INFORMATION: HEWLETT-PACKARD, 1820 Embarcadero Rd., Palo Alto, CA 94303.
CIRCLE 375, 334

—Lee The, Associate Editor

WORD PROCESSOR FOR ATARI 400, 800 AND 1200XL

Atari computers have suffered from an image of being little more than upgraded games machines. But looking at Atari's current software lineup, the image would appear to be undeserved. There's VisiCalc, Family Finances, Home Filing Manager, The Bookkeeper, Timewise (an appointment calendar), Telelink II (for accessing data bases, Microsoft BASIC and a greatly enhanced Atari BASIC. And now there's AtariWriter, a fine word processor.

AtariWriter comes in an inexpensive solid state ROM cartridge. It stores its text on disk or on tape. With the entire program in ROM, AtariWriter allows you to create files up to the limits of your Atari's RAM. For instance, with 16k RAM you can write and edit files up to a little over a single-spaced page long. With a 48k Atari you can work with files that translate into as many as five or six single-spaced pages.

Separate files can be linked for printing. The formatting commands let you do pagination, double-column printing, headers and footers, right and left justification, centering, subscripts and superscripts, and select from a variety of fonts.

AtariWriter is simple to master. Put the main diskette in the disk drive, turn on everything but the computer, put the AtariWriter ROM cartridge in its slot, and then turn on the computer. Now you will have the AtariWriter command menu on the screen, telling you all the things you can do in AtariWriter and which command key to press. The menu includes formatting options to store text, and options to create, edit, delete, load, save and print files.

When you're in the edit mode, you will see a nearly blank screen framed by some information along the top and bottom. The string of letters and numbers across the top indicates the default values for file formatting and printing. At least at the beginning, you don't need to know how to decipher or change those settings. Across the bottom are tab-setting markers and indicators telling you the line and row occupied by your cursor at the moment.

Now just start typing as if you were at a typewriter. You'll notice that your wordstream is automatically "wrapped," at the 40-character margin, to the next line. You hit RETURN only to mark the end of a paragraph. When you are finished writing, hit ESC to return to the menu, then S to save or P to print your output.

One excellent feature of AtariWriter is that it allows you to see what your printed copy will look like by using a preview command. While you edit on a 40-column screen, the preview shows you up to a 132-column output, depending on how your printout is formatted. The trick is that you only see part of the full display—40 columns at any one time. The cursor control keys let you move the 40-column "window" rapidly over the copy.

The Atari 800 and 1200 keyboards have good-quality keyboards that permit you to enter the text rapidly. Unlike some expensive computing systems, you'll never get ahead of the display as you type. For sophisticated editing it lets you move up to about 30 lines of text from one place in the copy to another. But there is a drawback to this function—if you try to move more than 30 lines, AtariWriter will lose the "excess." Another inconvenience of the program is that new text can only be entered in the insert command level. You can't just over-write text you want to delete; you have to delete it with a separate step.

AtariWriter costs $100. A word processing system complete with the Atari 800 computer, disk drive and dot matrix printer is priced at $1927.

FOR MORE INFORMATION: ATARI INC., 1265 Borregas Dr., Sunnyvale, CA 94086.
CIRCLE 376
—Lee Thé, Associate Editor

FOUR EDUCATIONAL GAMES

The Children's Television Workshop, the developers of Sesame Street, have created the Children's Computer Workshop to develop and market high-quality educational software for kids. Apple Computer is now selling four disks that contain 18 of the most popular educational games to come out of the Workshop's efforts.

The four diskettes are age-rated as follows: Spotlight (9-13); Instant Zoo (7-10); Ernie's Quiz (4-7); and Mix and Match—for all ages. Each diskette contains four or five different games. Three of the games require game paddles. Several won't work unless you have a color display. To run all the games, your Apple should have both Integer BASIC and Applesoft languages.

Each diskette comes with a backup disk and an instruction booklet. Besides containing full directions for using the games, the booklets contain suggestions for collateral activities parents and kids can do that are related to what the child has learned. For instance, "Guess Who" shows a dotted pattern on-screen that gradually resolves into one of the Sesame Street muppets. The challenge is to see how soon you can identify the character. One recommended collateral activity is to tell your child to inspect the images in the Sunday comics with a magnifying glass, and learn about the lithographic dots comprising those images. The child is also encouraged to draw some pictures with dots instead of lines.

The games themselves span a wide range of activities. In "Reflect" the game paddle controls the angle of an on-screen mirror. When you have it aimed where you want it, you push the game paddle button and a spotlight bounces a beam of light off the mirror. If it hits a target (there are quite a few), you win.

The most mature games include a simplified version of GO/Othello-type games, and a logic puzzle called "Hot Stuff." In "Hot Stuff," the computer chooses three digits. You guess which ones they are, and the computer tells you when you guess any of them correctly. But it doesn't tell you which one. Adults will find it interesting to see if they can get the numbers right with the fewest number of guesses, and even kids younger than the stipulated 9-13 age range will enjoy this game with adult help.

And that's the key to a lot of these games. They're participatory activities, providing an effective way for you and your children to play and learn together. You can help your kids exercise their problem-solving and memory-development abilities, as well as make them comfortable with computers.

The game disks cost $50 each, and run on the Apple II Plus and the Apple //e. Most of the games work on an Apple /// in Apple II emulation mode as well. If you want to start with just one disk, you might consider Mix and Match. It doesn't need game paddles and can be enjoyed by anyone out of diapers.

FOR MORE INFORMATION: CHILDREN'S TELEVISION WORKSHOP, 1 Lincoln Plaza, New York, NY 10023; (212) 595-3456.
CIRCLE 383
—Lee Thé, Associate Editor

WORD-PROCESSING PROGRAM IS FAST AND EASY TO LEARN

Bank Street Writer is one of those rare programs that's equally suited to home or business use. The program is easy to learn and is capable of producing anything from a memo to a book.

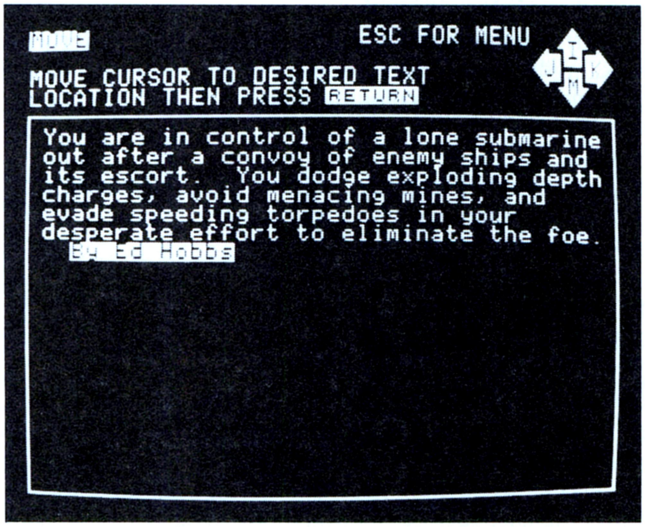
One important feature of BSW is its ability to store text in binary files which are easily read by other Apple word-processing programs. As a matter of fact, this report was written with BSW and sent over the phone lines via modem to *Personal Computing's* home office across the country where it was edited using another word-processing program.

BSW boots in less than 15 seconds and uses standard initialized disks. Files can hold up to 1300 words on a 48k Apple; 3200 words using a 64k system. Longer text can be broken into small files and linked for printing.

Text appears in a 40-character by 18-line edit window, with software-generated upper- and lowercase characters. BSW automatically configures itself to either the Apple //e or Apple II Plus keyboards.

Commands are displayed above the text window, along with a submenu of instructions. The menu includes text entry and deletion, cursor movement in four directions, search and replace, save and retrieve, and draft and formatted printing. Some of the more critical commands (like deleting disk files) are buffered, which means BSW queries the command before executing it.

The program also allows the user to indent and center text, move the cursor in 12-line blocks, and to see how much space is left in memory. The utilities program (engaged by hitting ESCAPE during booting) lets the user convert binary files into sequential text files and vice versa. It can reconfigure BSW default settings for hardware setup and printing parameters, engage or disengage the audible keyclick function, and catalog files and passwords.



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MOVE CURSOR TO DESIRED TEXT
LOCATION THEN PRESS RETURN

You are in control of a lone submarine
out after a convoy of enemy ships and
its escort.  You dodge exploding depth
charges, avoid menacing mines, and
evade speeding torpedoes in your
desperate effort to eliminate the foe.
   By Ed Hobbs
```
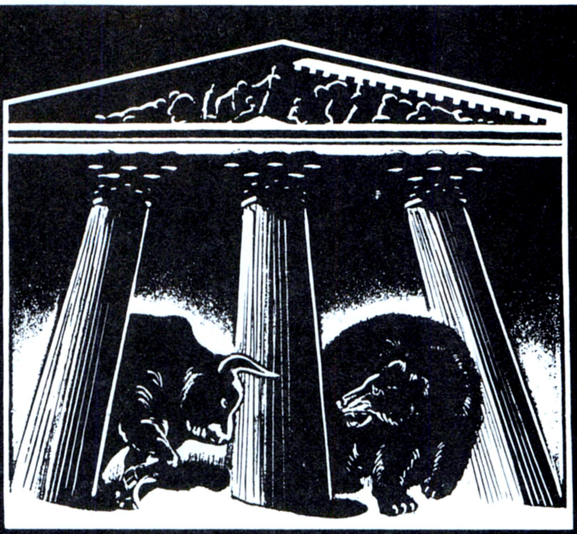

Editing commands appear above Bank Street Writer's 40-character by 80-line edit window.

The trickiest part of BSW is getting used to the program's 40-column display. Since your text is printed in 80-column format, what you see on the screen isn't exactly what you get on paper. On the other hand the display is brighter and more legible than some 80-column displays. You can also use a television as a monitor.

Users should delight in BSW's speed—no matter how fast you type, you won't get ahead of the display. Automatic word wrap lets you type without hitting RETURN,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CIRCLE 95

except at the end of a paragraph. Some of the other functions—deleting blocks of text, for instance—aren't as fast as other word processors.

The package sells for about $70, which is a good price considering the sophisticated programming required to give BSW its speed and a disk-based tutorial. Versions exist for the Apple //e and the Apple II Plus. The Atari version may be available soon and Commodore 64 and VIC-20 versions are in the works.

FOR MORE INFORMATION: BRODERBUND SOFTWARE, 1938 Fourth St., San Rafael, CA 94901; (415) 456-6424.
CIRCLE 225

—Lee Thé, Associate Editor

REVISED COMMERCIAL PROPERTY MANAGEMENT SYSTEM

Solid Software has recently expanded its Commercial Property Management System to include consolidated financial statements. This system is now totally integrable with Solid Software's general ledger, payroll, and accounts payable systems.

Consolidated financial statements can provide landlords or property managers with a property management system that handles financial statements for all the properties they manage. This new system also calculates late fees. Fees can either be calculated manually by each tenant each month, or a fixed fee may be assigned and automatically processed every month.

Ease of use is a feature of the new package. Property numbers need only be entered once, and escape functions allow the user to move out of data entry areas quickly.

The Commercial Property Management System runs under CP/M and MS-DOS. It sells for $1495 and is available from some 300 dealers across the country.

FOR MORE INFORMATION: SOLID SOFTWARE, 5500 Interstate North Parkway, Suite 501, Atlanta, GA 30328; (404) 952-7709.
CIRCLE 315

GRAPHICS PACKAGE OFFERS FLEXIBILITY IN CHART CONSTRUCTION

Mirrorgraph, a menu-driven graphics package, is designed primarily for users with little or no programming experience, but is sophisticated enough to handle numerical analysis. The system allows users to construct bar graphs, pie charts, and multiple line graphs from raw data.

Bar graphs created with Mirrorgraph can handle six entries. Each entry is proportioned to a scale displayed across the bottom of the screen and appears horizontally across the screen, labeled with a user-specified title and value. Chart headings and explanations for each axis are also supplied.

The package allows users to represent numerical data in a pie chart format. The pie can have up to 20 colored slices, each displayed as a percentage of the whole. Mirrorgraph will automatically print the name and percentage value of each slice.

The line graph feature allows users to draw up to four curves on a single set of axes with this package. Each curve is represented by a character and color reflected in the key at the bottom of the chart. Mirrorgraph adjusts the scale of the axes to correspond to the data supplied.

Each curve of the line graph can show as many as 100 data points which are represented either as a series of points or as continuous lines. These graphs may be displayed with or without a background grid.

Mirrorgraph can show 13 months of data on a single graph, allowing users to prepare annual reports and present yearly statistical data in a simplified, readable form.

All graph-construction routines include an audiovisual error-checking system for easy changes. Graphs can be stored on disk or printed out on a dot-matrix printer.

Mirrorgraph requires an IBM Personal Computer with 64k, a double-sided floppy disk drive, and a color-graphics adaptor. A color monitor and a dot-matrix printer are recommended.

Mirrorgraph retails for $59.95.

FOR MORE INFORMATION: MIRROR IMAGES SOFTWARE INC., 1223 Peoples Ave., Troy, NY 12180; (518) 274-2335.
CIRCLE 365

PORTFOLIO MANAGEMENT FOR THE APPLE II AND //E

Micro PMS from The Boston Company is a portfolio management system with templates for entry of buy, sell, and income transactions. It includes portfolio appraisal reports and has the capability to design reports in the user's own format. In addition to the investment software, the user receives monthly data disks covering 1500 popular stocks. Security prices can also be updated manually from the Dow Jones News/Retrieval Service.

According to The Boston Company, Micro PMS uses performance measurement techniques recognized as state of the art by leading institutional investors. The company invites comparison of its investment performance with any of the popular market indices.

The monthly data disks contain the latest stock prices, and also give earnings, dividend, growth, valuation, quality, and risk ratings. There are more than 40 data items available for each of 1500 stocks. The user receives updated stock data disks at the beginning of every month.

Micro PMS also features portfolio analysis which can be used to learn more about portfolio strategy and structure. Micro PMS displays a portfolio's percentage breakdown by economic sectors, growth rate, or any of the data items given for each stock.

A portfolio enhancer will compare a given portfolio with targets appropriate for the investor's objectives, and suggest possible trades to improve position. An investor then evaluates "what-if" buys and sells to determine the effect on a portfolio.

Micro PMS runs on an Apple II or //e with 64k of RAM and two disk drives. Optional hardware includes a printer, a telephone modem, and an 80-column card. For $595 the user gets all the software, a user's guide, and a 12-month subscription to monthly stock data disk updates.

FOR MORE INFORMATION: THE BOSTON COMPANY, One Boston Place, Boston, MA 02106; (617) 722-7939.
CIRCLE 363

YEAR ROUND TAX PLANNING PACKAGE FEATURES BOTH GRAPH AND REPORT FORMATS

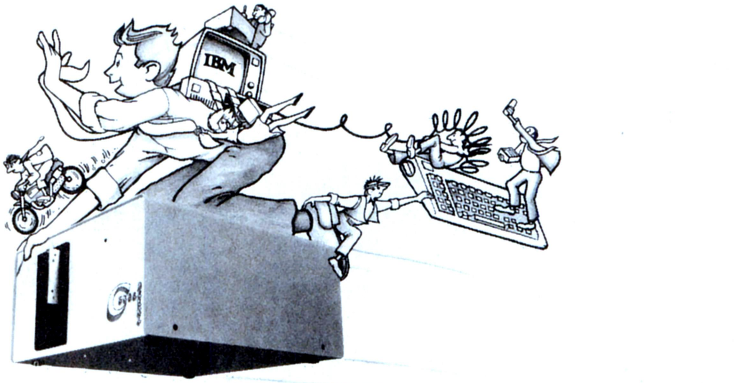
Tax Decisions, the latest addition to Eagle Software's "All Pro Series" of business software, is a tax planning package designed to assist tax professionals in formulating effective tax plans.

To help users analyze various tax plans, Tax Decisions displays key lines of Form 1040 in both graph and report format. Each graph and comparative report illustrates a client's liability calculated in a single plan, or displays a detailed comparison of all available plans.

"Because it is a tax planning software product, Tax Decisions is much more than just a 'seasonal' program that calculates your Form 1040," says Eagle president Terry Wright. "Instead, it is a year-round strategy tool designed to formulate as many as 60 separate tax plans using all the necessary Form 1040 entries, as well as 16 supporting schedules and forms."

To protect users from changes in tax legislation, update programs are also provided free of charge for one year from date of purchase. The price of the package is $229.

FOR MORE INFORMATION: EAGLE SOFTWARE PUBLISHING INC., The Woods, Suite 409, 993 Old Eagle School Rd., Wayne, PA 19087; (215) 964-8660. CIRCLE 555



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CIRCLE 151

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CIRCLE 96

COMING IN FUTURE ISSUES

Getting Time On Your Side

A time-management program can be a valuable tool for the manager or executive with an active schedule. Time-management packages for use on personal computers can help the user set priorities, schedule (and keep) appointments, and coordinate the activities of department personnel. Find out what packages are available and what they can do for you in the June issue of *Personal Computing.*

Video Game Buyer's Guide

Video game sales are bigger than ever, and so is the selection of games available. Games of adventure, fantasy, and action come in a wide range of skill levels, graphic sophistication, and price. See what's new in the video game market in our Buyer's Guide to Adventure Games in the June issue of *Personal Computing*.

Thinking Computers

As a researcher in artificial intelligence at Yale University, Natalie Dehn is trying to forecast the effects of the computer revolution on human thought processes. In an interview with *Personal Computing,* she discusses her work and offers her observations on how computers are changing the way people think.

Computer Typesetting By Telephone

Businesses can cut typesetting costs by transmitting material directly to the typesetter through a word processor and telephone modem. This method can reduce input costs and turnaround time while still providing the benefits of professional typesetting and printing. Read how to set up such a system in the June issue of *Personal Computing.*

Can Two Computers Live As Cheaply As One?

As members of the family compete for time on the home computer, many people are considering buying a second computer for home use. What should you look for in a second computer? Can two computers share peripherals? Software? Find out in the July issue of *Personal Computing.*

Buyer's Guide To Computer Furniture

As technological advances bring us more sophisticated computers, computer furniture manufacturers are responding with innovative, ergonomically designed furniture to support and enhance the new hardware. For a full report on computer furniture, see the special Buyer's Guide in the September issue of *Personal Computing.*

ACCOUNTANT/CLIENT WRITE-UP PACKAGE

Starsoft has introduced CPApartner, a client write-up and billing system for small- to medium-size accounting firms. The package contains two modules—one for time management and billing, and one for client write-ups.

Both modules offer system setup parameters for a variety of peripherals, allowing the user to customize. The time management and billing module includes monthly and year-to-date summary reports. The client write-up module lets the user post client journal entries and produces a set of financial statements. It also includes a file that saves chart categories, statement headings, and lists of clients.

CPApartner can manage and schedule 500 clients, handling up to 4500 monthly journal entries per client. If the user's computer has an internal clock card, the program will track time spent updating each client's records and list the proper charges.

CPApartner has several special features. The user can obtain revenue analysis by skill level, employee, and job type. A mailing list can be compiled with sort and select functions. This package will also spot mistakes. For example, unbalanced client entries cannot be posted, and account numbers with an existing balance cannot be deleted.

This program runs on an Apple II or Apple /// with floppy or hard disk drives. Starsoft recommends a hard disk drive, however, in order to speed up the billing process and to handle large client data bases.

The complete CPApartner retails for $1295. The client write-up module is available separately for $695.

Starsoft provides a toll-free number, and in-house CPAs and other accountants are available to answer financial and technical questions.

FOR MORE INFORMATION: STARSOFT, 4984 El Camino Real, Suite 125, Los Altos, CA 94022; (415) 965-8000.
CIRCLE 317

HEALTH CARE ACCOUNTING SYSTEM

Compupeg Software has a new entry in the vertical software market. The product is called Compupeg, and it's a pegboard accounting system for health care professionals. This package is designed to serve a one- to four-person practice with accounting functions such as receivables, aging of accounts, insurance forms, patient recall, and ledger accounting. The user can control all record keeping from the office.

Compupeg has two major components. One is Patient Accounts, with does transaction, recall, and billing. The other is General Ledger, which keeps track of paid and unpaid accounts, and gives daily, monthly, quarterly, or annual reports.

Compupeg uses the MicroSoft BASIC language, and runs on the CP/M or MP/M operating system. The company suggests the IBM Personal Computer, Xerox 820, Vector Graphic, or California Computer Systems hardware. It recommends a hard-disk system, though Compupeg will fit a system with 64k internal memory using floppy disks. You can store 3000 patient accounts per megabyte, and accounts receivable has room for 30,000 accounts.

Compupeg Software offers a 45-day trial of this program. For $50 the company will send the user programming and file space for 10 accounts. If this type of program fills his needs, he can send Compupeg the remaining balance of $650 and receive programming with file space for 30,000 accounts. If Compupeg does not meet the user's needs, he can return the manual and disk for a refund of his initial $50.

FOR MORE INFORMATION: COMPUPEG SOFTWARE SPECIALISTS, 1202 West Ridgeway, Waterloo, IA 50701; (319) 233-2816.
CIRCLE 227

VOCABULARY BUILDING FUN

Program Design Inc. has announced a four-cassette package called Vocabulary Building Games. The games are designed to provide entertainment while sharpening vocabulary, logic, and problem-solving skills. The computer chooses words at random, creating its own puzzles. This presents the player with thousands of different puzzles to solve.

There are four games in the package: AstroQuotes, Kross 'N Quotes, Minicrossword, and Time Bomb. The accompanying user's guide describes each game and how to use it. The guide also suggests supplementary activities for improving vocabulary skills.

In AstroQuotes, the player must guess four words from clues given by the computer. The player tries to use the information to guess a famous quotation. Quotes range from the philosophy of Aristotle to the humor of W. C. Fields.

Kross 'N Quotes presents the player with many scrambled letters. The object is to take letters from the bottom of the screen and put them into correct slots at the top of the screen. The letters form a well-known quotation. Speed is the key to this game—the easier the quote, the less time a player has to solve it.

In Minicrossword, the player must complete a crossword puzzle. The computer scores the player on how well he solved it. Wrong guesses and blanks count against the player.

Time Bomb is a computerized version of Hangman. The computer chooses the secret word, and the player is told the number of letters the word contains. If the player doesn't guess the word within the time limit, a bomb explodes.

Vocabulary Building Games is designed for the Atari

400 or 800 with 24k (a 16k version may also be available). The price for four cassettes, a user's guide, and a storage container is $59.95. The games can also be purchased separately on cassette or disk. Cassette versions retail for $16.95 each; disk versions are $23.95 each.

FOR MORE INFORMATION: PROGRAM DESIGN INC., 95 East Putnam Ave., Greenwich, CT 06830; (203) 661-8799.
CIRCLE 553

TWO UTILITIES FOR APPLESOFT USERS

Micro-Sparc, Inc. is offering two new utilities for Applesoft BASIC users: MacroSoft and The Assembler.

Micro-Sparc terms its MacroSoft package "a new breakthrough approach to Applesoft BASIC programming." MacroSoft allows the user to write Applesoft-like programs which are converted directly into machine language. The company says this process results in programs that are up to 50 times faster than Applesoft, and up to 10 times faster than compiled Applesoft.

MacroSoft adds commands not included in Applesoft. Some of these commands are: IF-THEN-ELSE, REPEAT-UNTIL, BUTTON, SOUND, and WHILE-WHILEN. If a user knows advanced programming and assembly language, he has the added convenience of being able to mix assembly language and MacroSoft in the same program.

The package runs on the Apple II, II Plus, and //e, as well as Applesoft-compatible computers such as the Franklin ACE. It requires 48k of RAM, one disk drive, and The Assembler package.

The Assembler, a new assembly language for Applesoft-compatible systems, provides up to 29.5k more memory for source programs. This package can be used alone or as a companion program to MacroSoft. It has a global editor that includes features such as search and replace. With the Assembler, the user can write his own subroutines and call them by name. He can also produce a list of variable names, and their locations in his program.

A collection of macro commands that simulate the commands of other assemblers such as the Apple ToolKit is included in The Assembler. The combination of MacroSoft and The Assembler lets the user write BASIC programs that will run in machine language.

The Assembler requires Applesoft, DOS 3.3, one disk drive, and 48k of RAM. Alone, the program sells for $69.95. The combined package with MacroSoft and The Assembler sells for $99.95.

FOR MORE INFORMATION: MICRO-SPARC, P.O. Box 325, Lincoln, MA 01773; (617) 259-9710.
CIRCLE 421

GRAPHICS AND CALCULATION IN ONE PACKAGE

Desktop Computer Software has announced Graph 'n' Calc for the IBM Personal Computer. This business graphics system has a calculation feature and can be used as a decision support and display tool for both the novice and the experienced user.

Graph 'n' Calc provides statistical and financial functions such as multiple linear regressions, net present value, internal rate of return, and exponential smoothing. All functions are menu driven.

Because the IBM Personal Computer supports high-resolution color graphics, Graph 'n' Calc can be used to make detailed line charts, side-by-side and stacked bar charts, stock market charts, and a variety of labeled pie charts. The user can also organize charts for a slide show, and call up a series of charts on an elapsed time or individually keyed basis. Hard copy can be produced on Epson MX-series printers with the Graphtrax option, or with a Hewlett-Packard two-pen color graphics plotter.

Commands are entered with a single keystroke. The user can speed up input by using current value defaults

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that assume numeric values common to many financial models. Menus are expansive, and if the user selects the wrong menu, he can exit by hitting the ESCAPE key.

Graph 'n' Calc requires a single drive IBM Personal Computer with 64k of RAM, and a monochrome or RGB color monitor. The price is $199.95.

FOR MORE INFORMATION: DESKTOP COMPUTER SOFTWARE, 303 Potrero St., Santa Cruz, CA 95060; (408) 458-9095.
CIRCLE 340

TEXT MANAGEMENT SOFTWARE

FYI has introduced SUPERFILE System 3, a text management program for CP/M-based systems. This package lets the user update and reindex up to 65,000 records per data base. Each free format, variable length record can have as many as 500 of the user's key words for descriptors, with a maximum or 32,000 key words per data base.

With SUPERFILE System 3 the user can cross-index and retrieve records by linking 128 key words with "and," "or," and "not," and can search 255 floppies. SUPERFILE System 3 counts the times each key word occurs in the alphabetized key word listing. These key words can be itemized on the program disk, and the listing will tell the user on which disk the key word appears.

Included with SUPERFILE System 3 is a program called Post Haste, which allows the user to format and print mailing labels, envelopes, membership lists, directory listings, and other information retrieved from SUPERFILE System 3 searches. The program can sort alphabetically or by ZIP code. Post Haste, which can be purchased separately for $95, can be used by itself or with MicroPro's MailMerge.

No programming is necessary to use SUPERFILE System 3. It requires CP/M 2.2 or IBM PC-DOS 1.1, and two disk drives or hard disk. The suggested retail price for SUPERFILE System 3 with Post Haste is $295.

FOR MORE INFORMATION: FYI, INC., P.O. Box 26481, Austin, TX 78755; (512) 346-0133.
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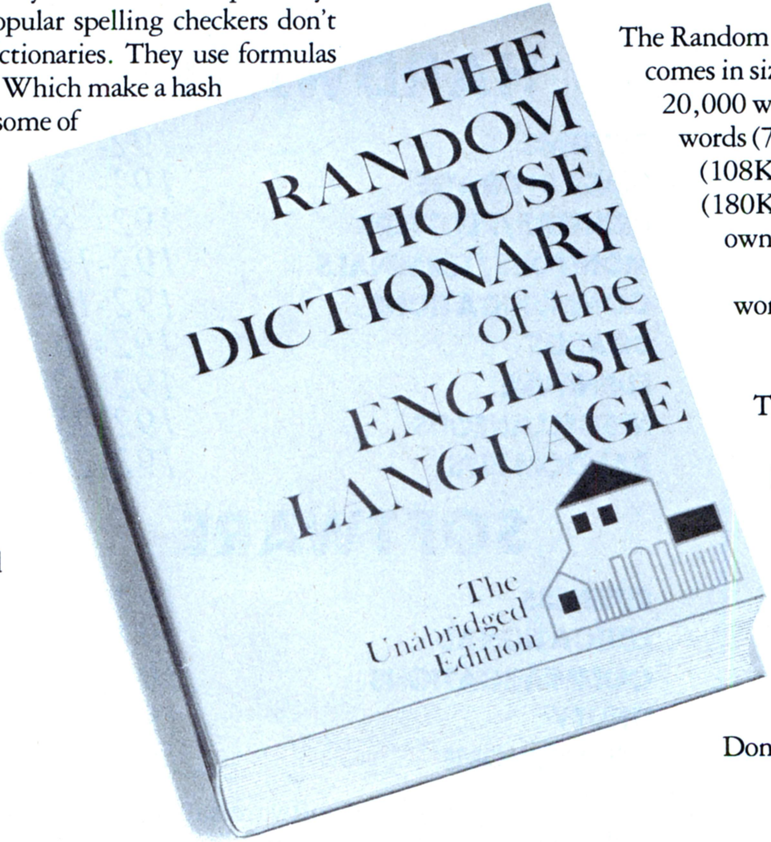

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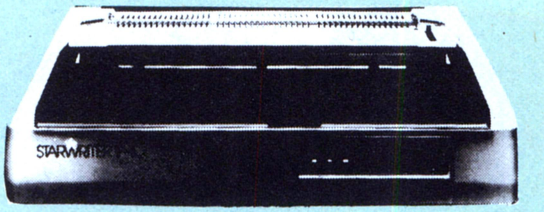

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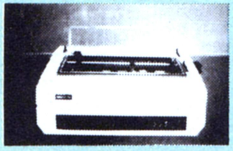

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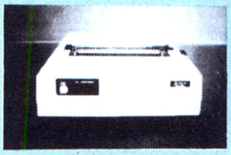

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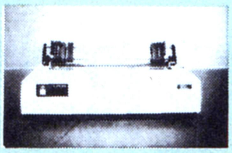

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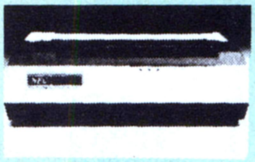

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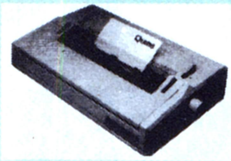

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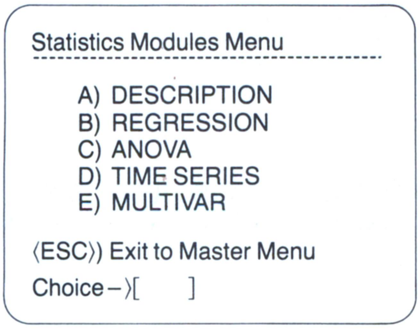

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Statistics Modules Menu
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     A) DESCRIPTION
     B) REGRESSION
     C) ANOVA
     D) TIME SERIES
     E) MULTIVAR

〈ESC〉) Exit to Master Menu

Choice –〉[     ]
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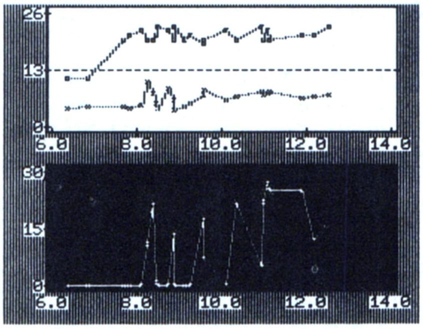

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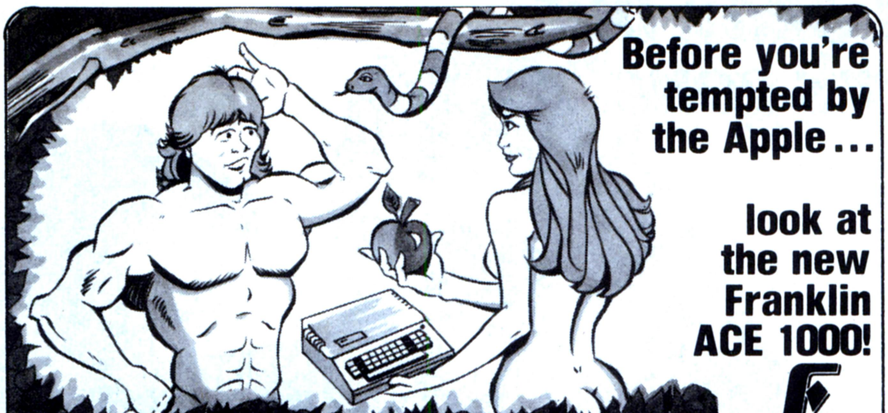
PC

CIRCLE 114



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(continued on page 192-14)

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CIRCLE 116

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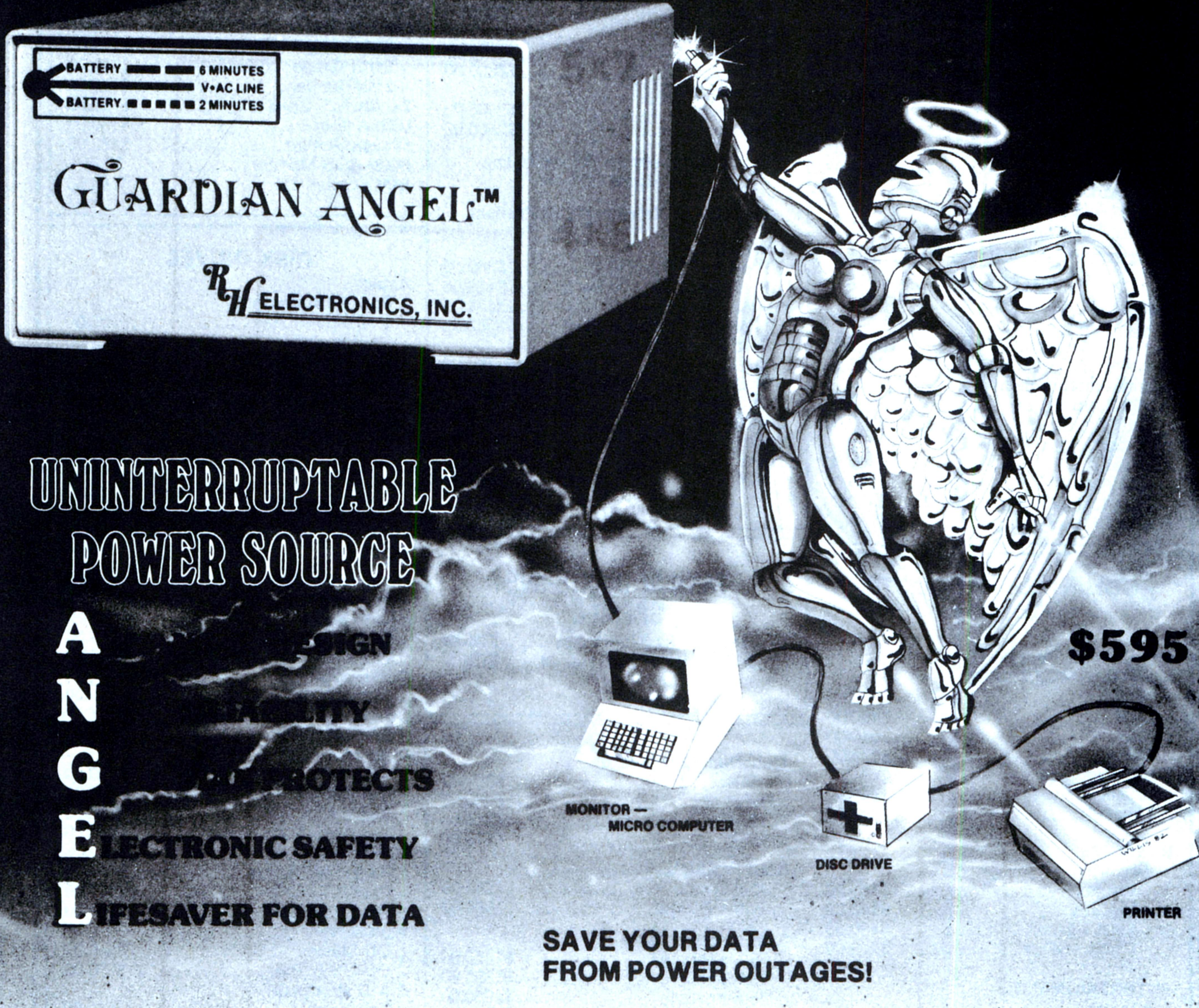

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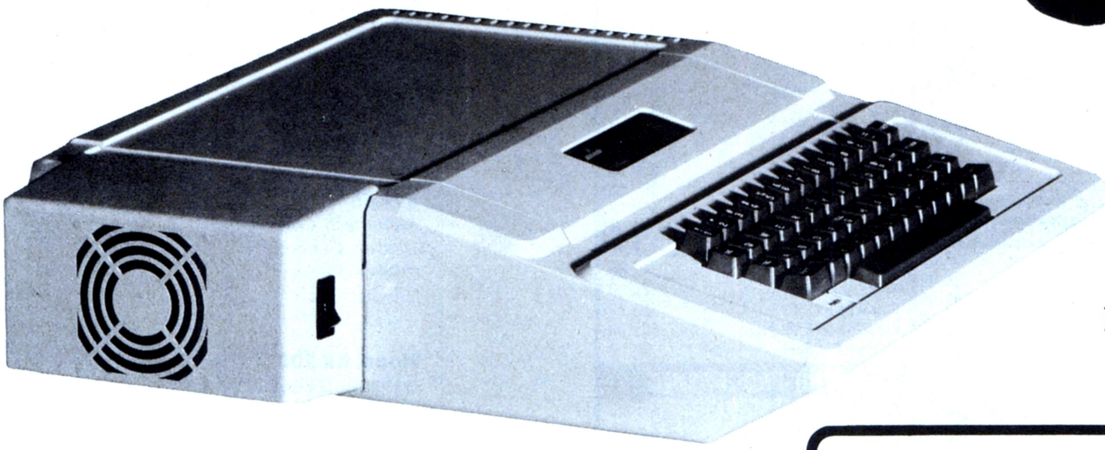

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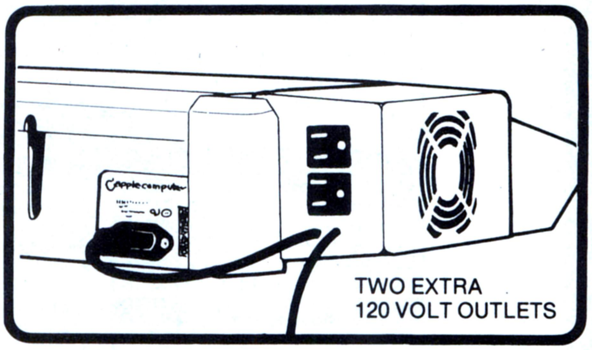

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(continued from page 192-10)

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CIRCLE 188

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CIRCLE 119

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CIRCLE 473

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CIRCLE 478

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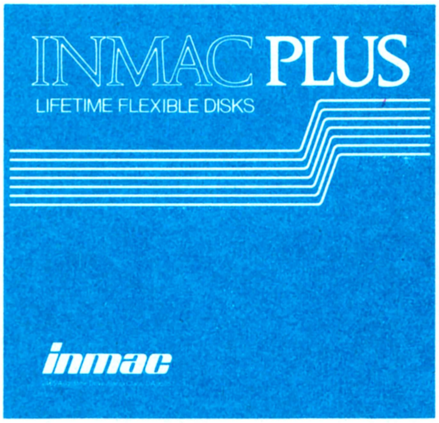


Inmac Plus diskettes surpass every applicable performance standard in the industry. Trust them with your most critical programs and data.

All you have to do is ask, and we'll send you three Inmac Plus premium diskettes.

One—up to a $9.90 value—is free.

The other two are for you to use for 45 days at no obligation. Test them out. Compare them to the diskettes you're now using.

We're convinced that once you try Inmac Plus, you'll buy Inmac Plus. And nothing else.

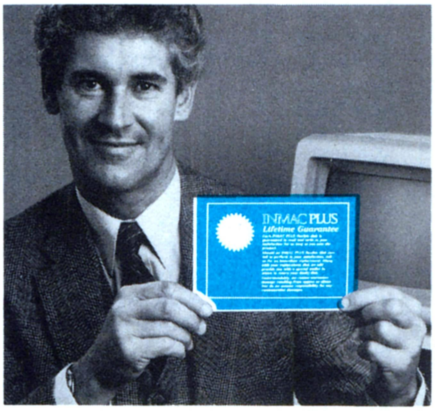
But if you're not completely satisfied, simply return the two diskettes and keep the third one with our compliments.

Inmac Plus quality for error-free performance.

Do your floppy disks work the first time, every time you put them in your drive?

Ours will, and we're not just saying that. We back every Inmac Plus diskette with the strongest guarantee in the industry—*a lifetime guarantee.*

For as long as you own an Inmac Plus diskette it will read and write flawlessly. It will protect your data. It will perform to perfection—or we'll replace it free.*



With Inmac Plus diskettes, you're guaranteed 100% read/write accuracy and lifetime data protection.

The problem with ordinary floppy disks is that they gradually wear down under the everyday stress of drive heads and pressure pads. This can result in everything from annoying read/write errors to complete data loss.

Inmac Plus diskettes don't have this problem. They're made with a durable oxide coating that "gives" not flakes as hard-coated disks do. So you don't wind up gambling with your data or wasting hours of valuable programming time.

Inmac Plus diskettes excel on all types of drives, even finicky ones. One reason for this is a special reinforced hub ring that protects against a major cause of data loss—warps, dents, and tears resulting from the drive's clamping hub.

In all, Inmac Plus diskettes go through 32 separate quality tests. And each is given an individual registration number to help us maintain the highest quality standards possible.

Due to this stringent quality assurance program, they surpass every applicable performance standard in the industry. You can trust them with your most critical programs and data.

Nothing compares– at any price.

Add it all up.

Inmac Plus diskettes give you total reliability. 100% read/write accuracy. Lifetime protection for your data.

That's why they're your best buy—at any price.

This exclusive Trial Offer ends August 31, 1983.

Here's how it works.

Simply mail the attached card or phone our toll-free number by August 31, and we'll send you three Inmac Plus diskettes—one of which is yours to keep, no matter what.

The other two are yours to use for 45 days at no obligation. Return them if not completely satisfied.

But we're expecting just the opposite. We think you'll be so utterly impressed, you'll want to keep the two diskettes.

That's why we're enclosing an invoice with your order, so that by the end of the trial period, you can mail it back to us, along with your check or money order. Or if you prefer, use your credit card—whichever is most convenient for you.

Remember, send no money now. We want you to try Inmac Plus before you buy Inmac Plus, and we'll ship your diskettes within 24 hours so that you can get started as soon as possible.

Offer limited to one free diskette per customer. Offer void in Alaska and Hawaii.

Get three diskettes for the price of two.

To be sure of getting the Inmac Plus diskette that's right for your system, specify its make and model. Below are some of the most popular systems and the corresponding Inmac Plus diskette. If yours is not listed, call us for assistance and pricing information.

System	Inmac Plus description	Price for 3 diskettes
Apple II, II Plus, III; IBM PC (single side); Osborne PC; Radio Shack TRS80-1 or 3	5¼" SSDD Soft Sector	$11.80 (save $5.90)
AB Dick Magna Writer; Cromemco Z2H; HP85/Series 9826A, 9836; IBM PC (Dual Side)	5¼" DSDD Soft Sector	$16.80 (save $8.40)
DEC RX01; IBM System 32, 3737, 3740, 3730, 3741, 3600, 3601, 3790, 3791	8" SSDD Soft Sector IBM|format 2305830	$15.80 (save $7.90)
CDC 9406; HP3000 Series 33; IBM Series I, diskette 2, IBM System 34, diskette 1	8" DSDD Soft Sector	$19.80 (save $9.90)

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Send attached postage-free card or phone toll-free.

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[1 (800) 547-5447 in California.]

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CIRCLE 120

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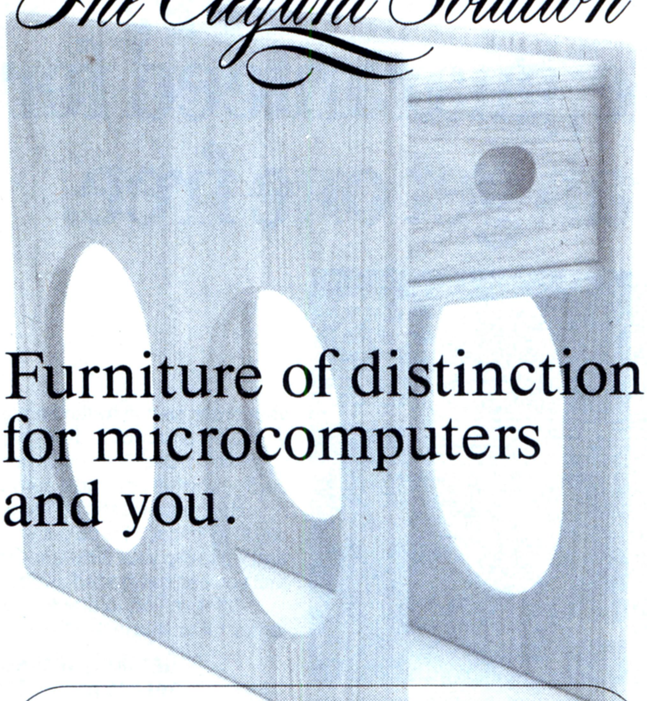

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CIRCLE 121

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CIRCLE 479

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doubles the standard memory of the standard Apple //e with 64k of RAM; card allows for an 80-column display also
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(continued on page 192-22)

WORD CHALLENGE
The Ultimate Word Game

for Apple™, IBM™ and Osborne™ computers

WORD CHALLENGE
PROXIMITY
PROXIMITY™

Ready for some mental gymnastics, computer style? Take on Word Challenge,™ one of the most advanced, intelligent software game programs available. The object: locate the hidden words in a square of random letters. The competition: (heh, heh)…a little surprise from the programmers—LEX, an opponent of uncannily human intelligence. Word Challenge generates the game board (note the sample square, with 166 hidden words) and you race the clock with LEX to see who finds the most words. Naturally LEX knows that the longer the word, the better the points. So while you might enter "bar," "ant" and "den," LEX is picking out "abrase," "resented" and "serene," all part of his remarkable 90,000-word vocabulary. But don't give up hope. If LEX seems a little too formidable at first, you can give him a sort of electronic lobotomy by selecting from his 26 different playing levels. You can also choose the square size, time limit and a variety of scoring methods.

Word Challenge is a fast, entertaining and educational game that'll provide hours of fun for the whole family. It's great as a teaching tool for building vocabulary, spelling and problem-solving skills.

To master the Word Challenge, take a mere $39.95 to your nearest personal computer dealer. For Mastercard and Visa orders, call toll-free, **1-800-323-0023**. In Florida, call collect, 305/566-3511. Or complete the coupon and send your check or money order for $39.95 (plus $2.00 shipping and handling) to: Word Challenge, Proximity Software, 3511 N.E. 22nd Avenue, Fort Lauderdale, Florida 33308.

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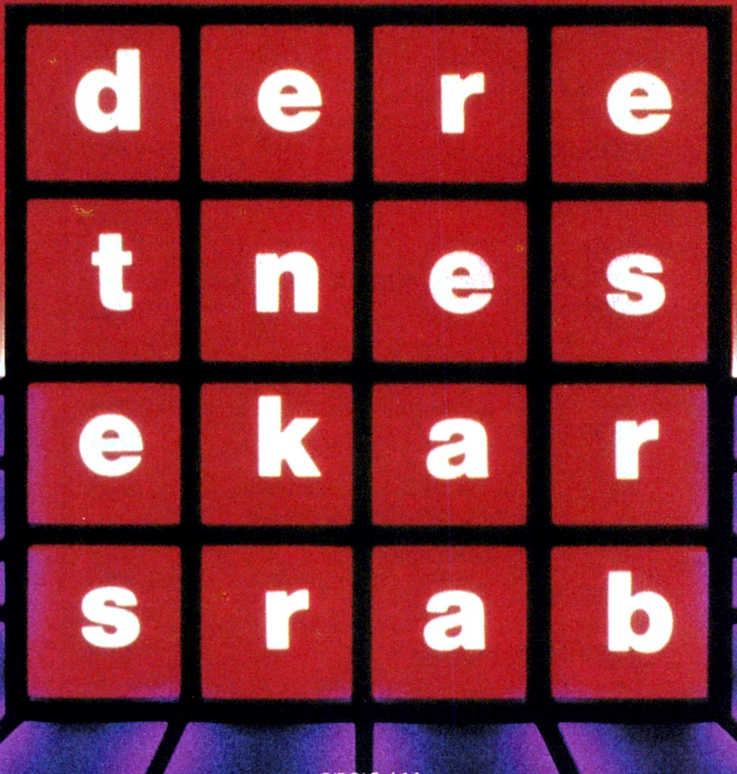

d	e	r	e
t	n	e	s
e	k	a	r
s	r	a	b

CIRCLE 144

PROXIMITY™

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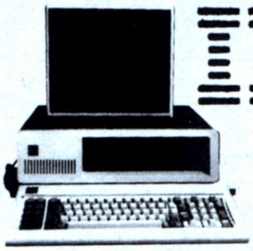

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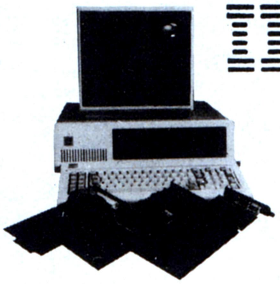

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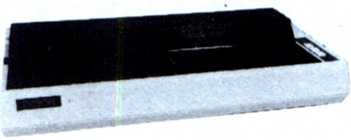

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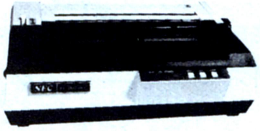
COMPUSHACK *NEC*



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CIRCLE 123

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PDI

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(continued from page 192-18)

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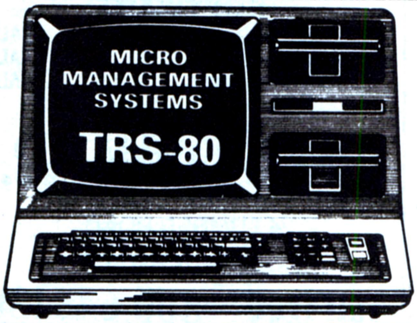

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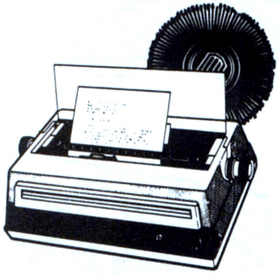

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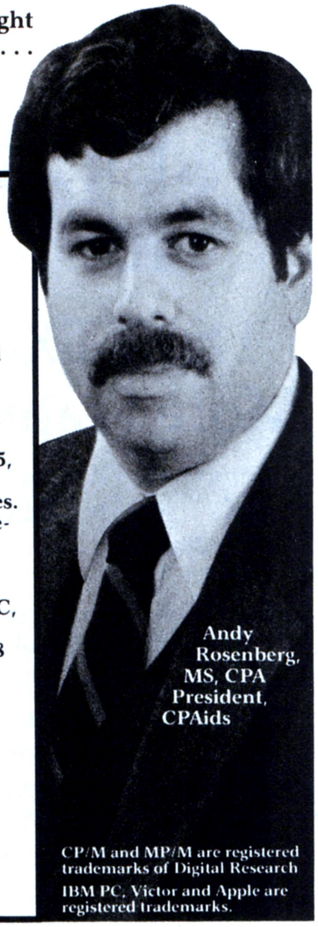

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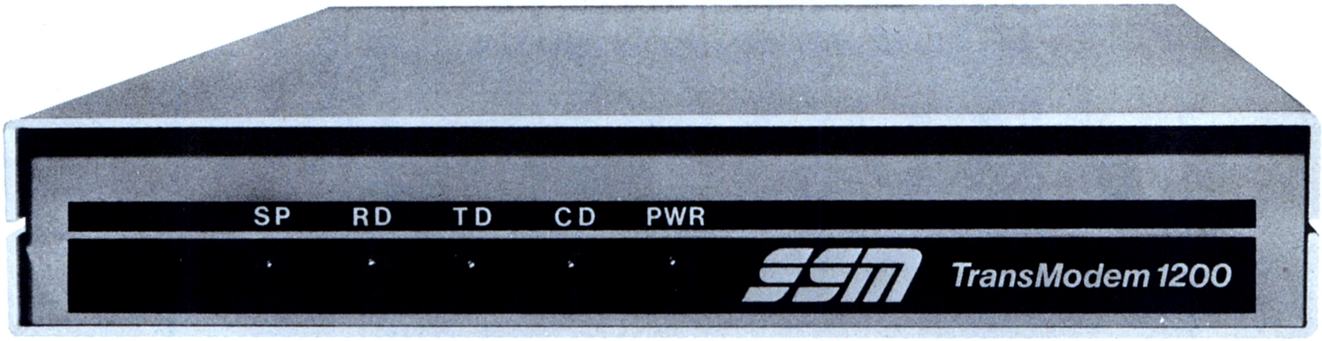

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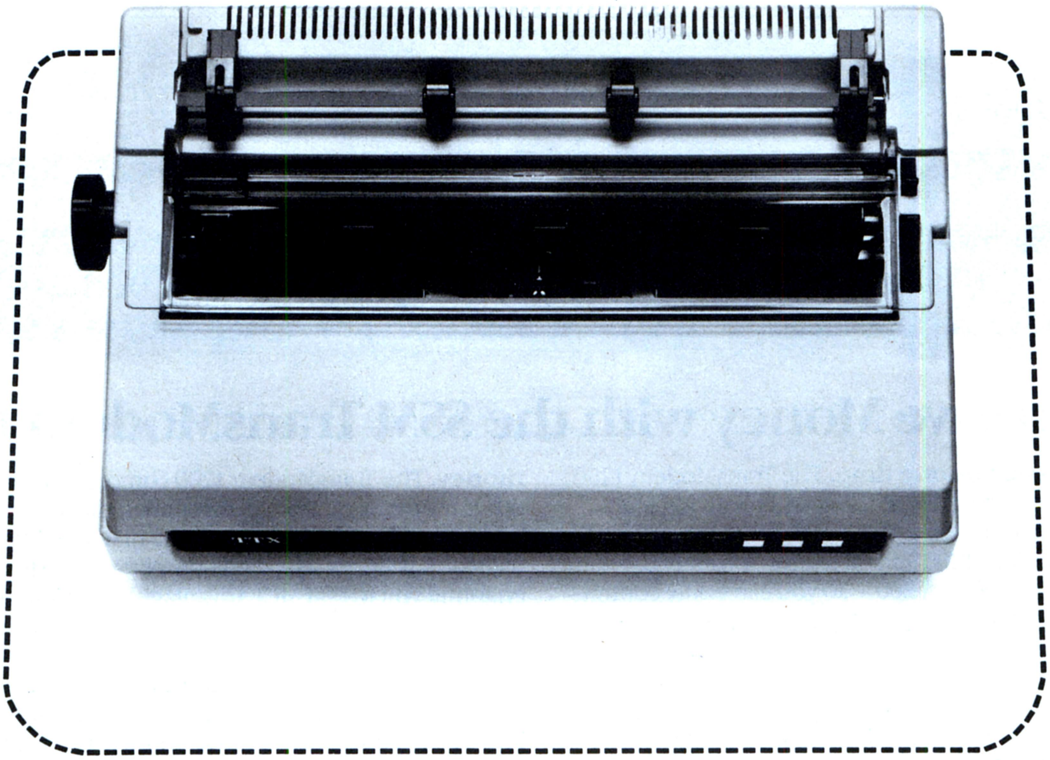

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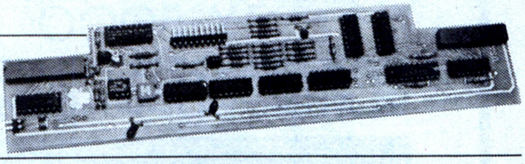

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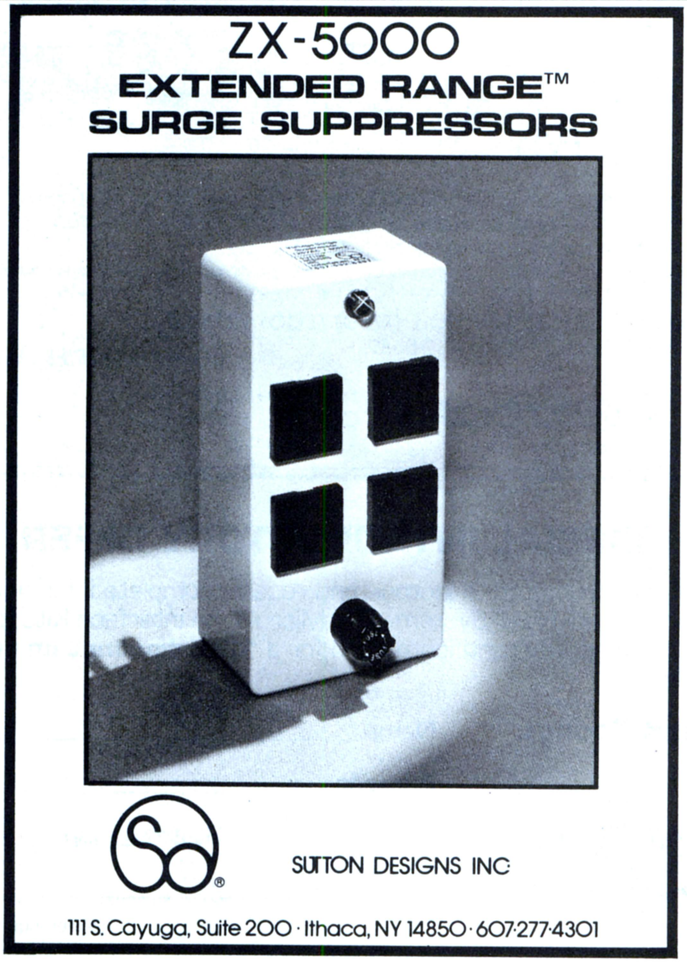
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(continued on page 192-36)

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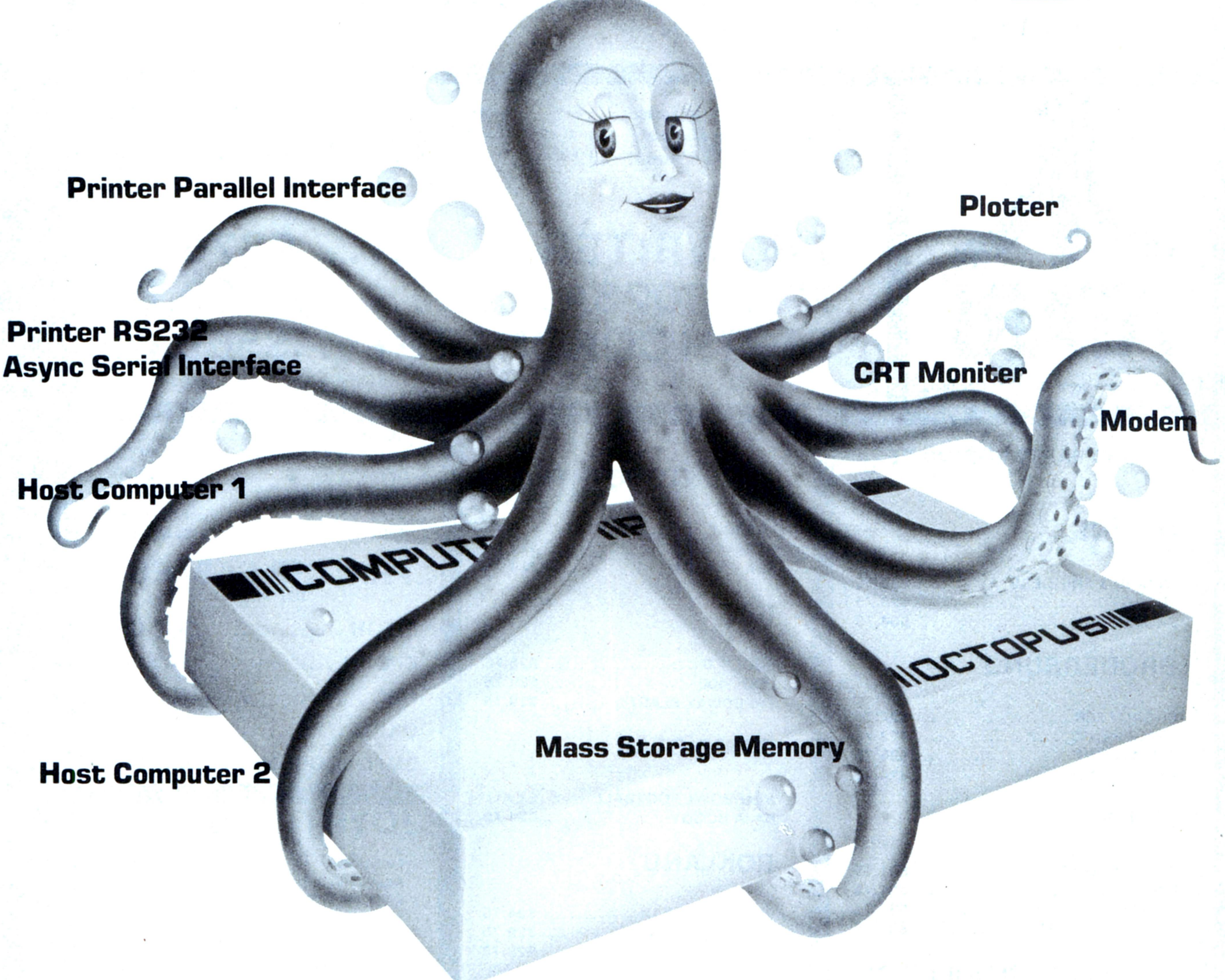
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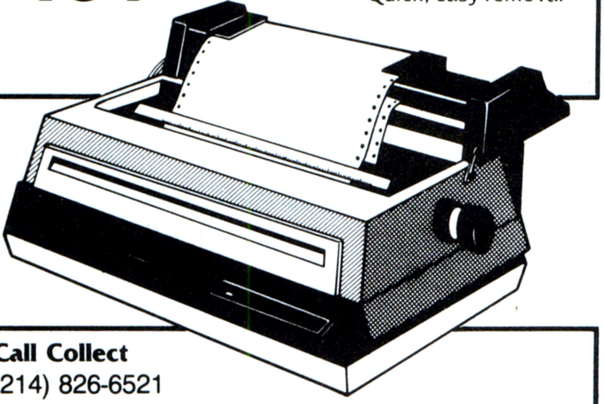

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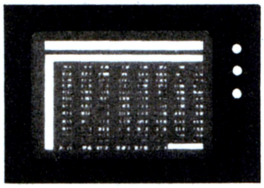

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(continued from page 192-32)

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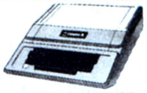

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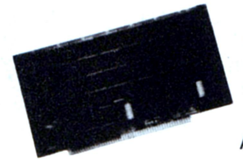

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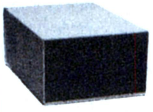

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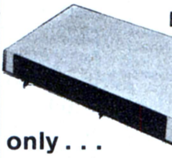

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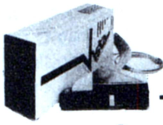

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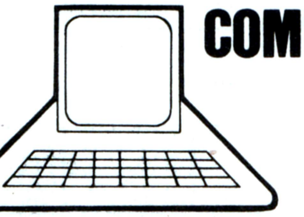

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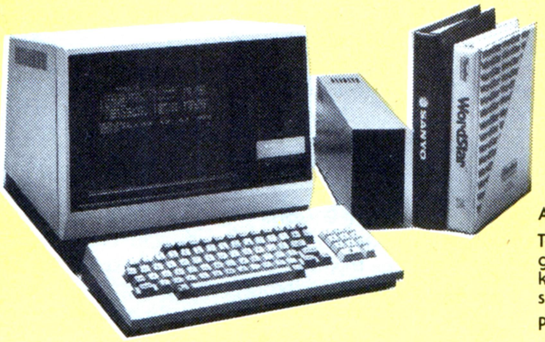

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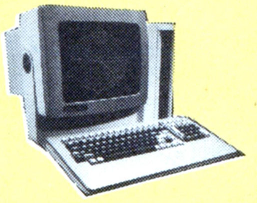

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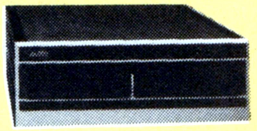

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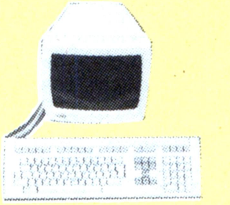

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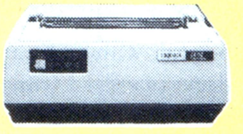

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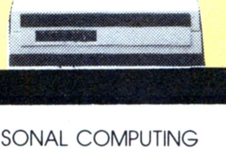

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(continued on page 192-48)

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Denver Software		
Pascal Tutor	125	97
Pascal Programmer	296	223
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Eduware		
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Perception	25	19
Statistics	30	22
Spelling Bee with Reading Primer	40	30
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Supertext 40/80	175	126
Form Letter Module 48K	100	72
Address Book Mailing List 48K**	50	36
Data Plot 48K**	60	43
Elementary Math Apple Soft 48K**	40	29
The Voice 48K	40	29
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On-Line Systems		
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The Dictionary	100	70
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• for Apple CP/M	125	94
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Visischedule ///	300	234
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(continued from page 192-45)

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for IBM Personal Computer and MS-DOS-based systems
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Kenosha, WI 53140
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CIRCLE 154

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Produced By VisiCalc® Specialists:

The VisiCalc® Audio Course was written by and produced in conjunction with SpreadSoft™, The Electronic Spreadsheet Support People™. The programmers at SpreadSoft™ are experts at VisiCalc® applications, and provide insights and programming tips gained from their creation of VisiCalc® Business Financial and Management templates.

Contents:

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A 90-minute instructional tape introducing the VisiCalc commands. The Beginner will lead you step by step through both the major commands and sub-commands. The emphasis is on a practical demonstration of each command using a 'hands on' 'try it out and learn' approach.

TAPE TWO: The VISICALC® Functions™
A 90-minute instructional tape that will teach you how to use VisiCalc's:

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b. Listing Functions @SUM, @COUNT, @AVE, @MIN, @MAX
c. Trigometric Functions @SIN, @COS, @TAN, @ASIN, @ACOS, @ATAN
d. Logical Functions @TRUE, @FALSE, @AND, @OR, @NOT, @IF, @ISNA, @ISERROR
e. Special Functions @NA, @ERROR, @PI, @NPV, @LOOKUP, @CHOOSE
f. Nested Functions and Boolean operators

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retail
CIRCLE 353

Magicalc
spreadsheet program featuring variable width columns; individual cells may be made invisible to hide sensitive data
for Apple //e
$149.95
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North Hollywood, CA 91601
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for Apple //e
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MagicPrint
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for SB-80 or CP/M-based systems
$195
Lifeboat Associates
New York, NY 10028
retail or mail order
CIRCLE 356

Magic Quill
bookkeeping and accounting program for accountants; bookkeeping and tax professionals can accommodate up to 400 ledger accounts
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$2000
Starsoft
Los Altos, CA 94022
retail
CIRCLE 357

Magic Window //e
word-processing system that operates with the Apple //e's built-in, 40-column display or with the addition of an 80-column board; program shows on the screen exactly what you will get from a printout, including formatting
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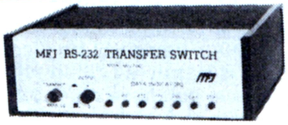

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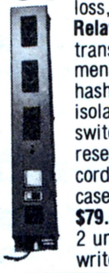

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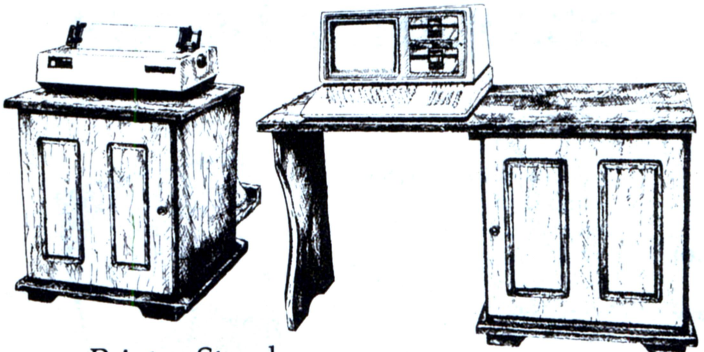

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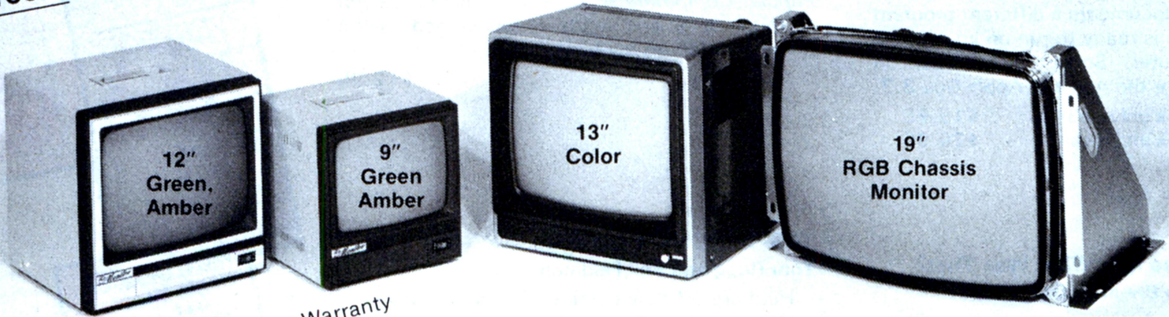

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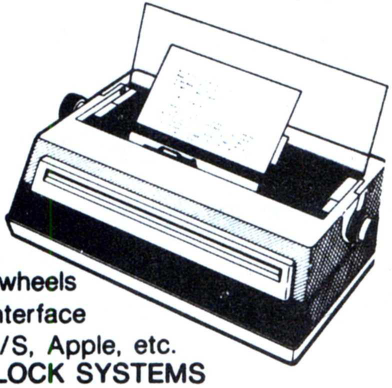

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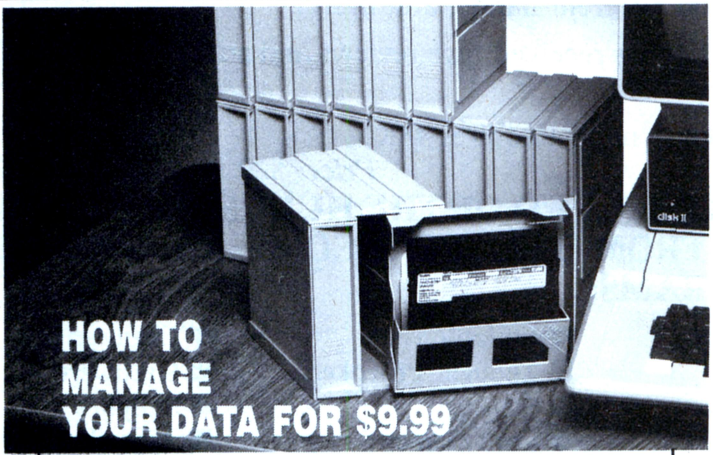

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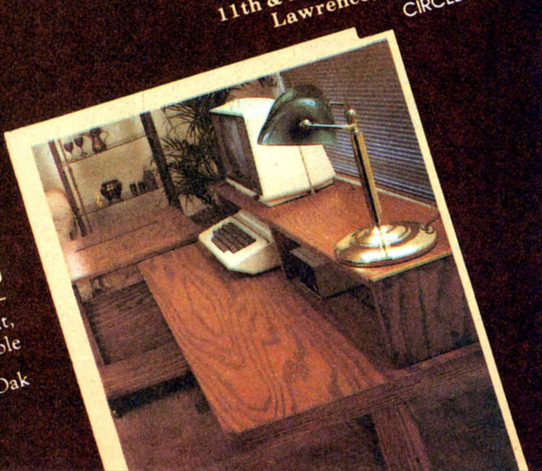

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Wico Trackball	$ 49
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Kraft Paddles	$ 34
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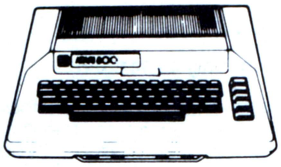

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(continued from page 192-62)

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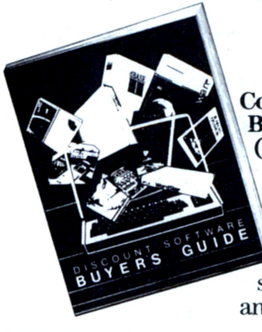

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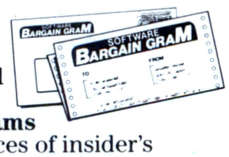

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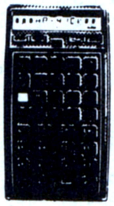

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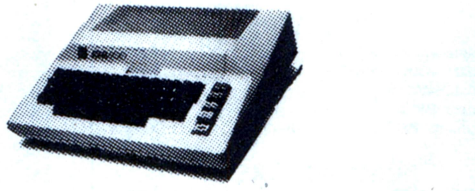

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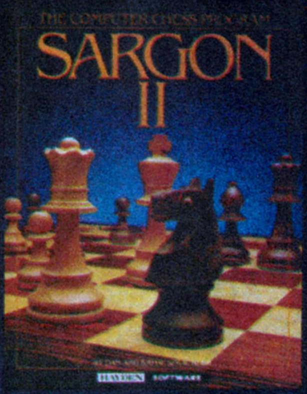

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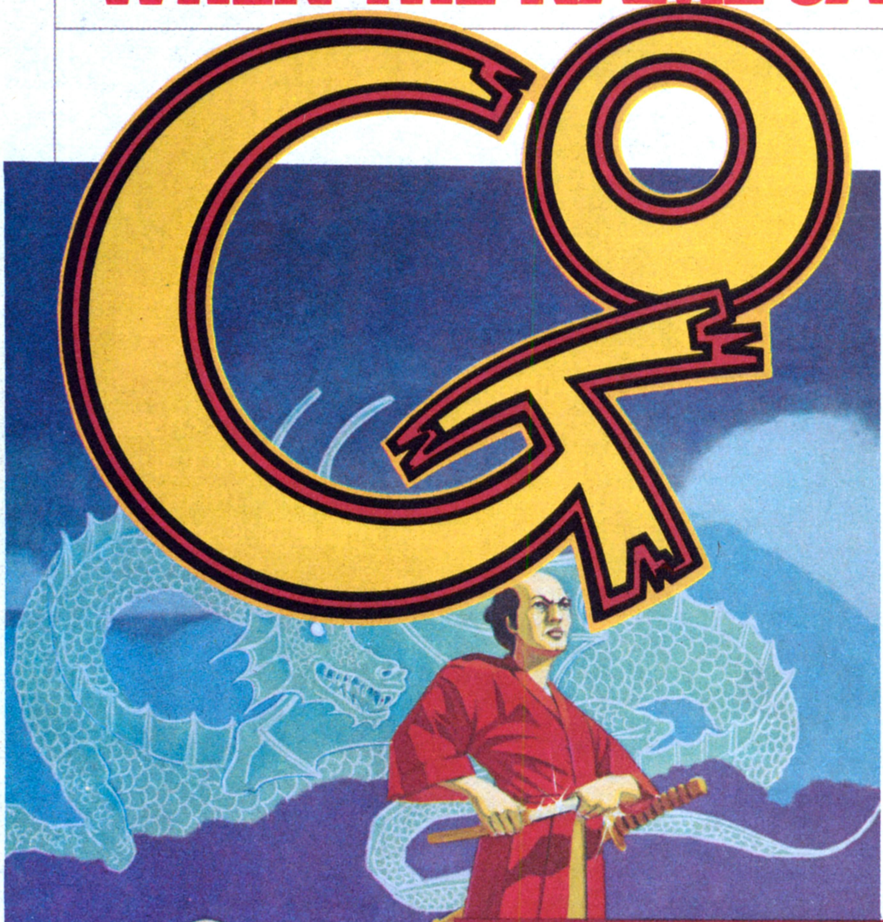

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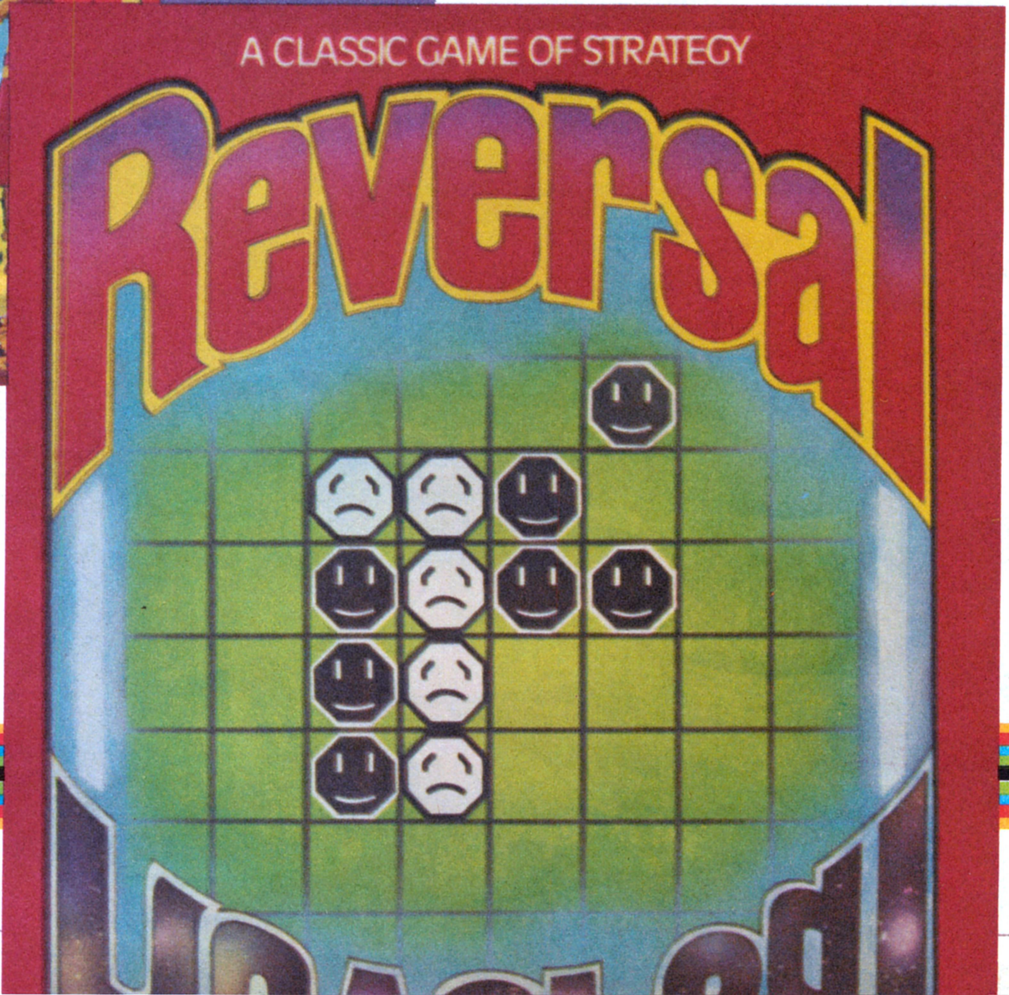
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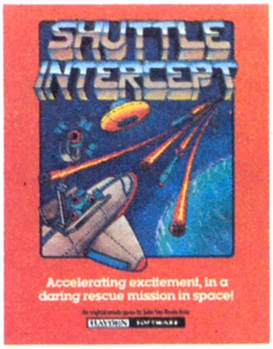
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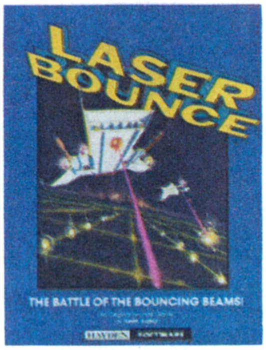
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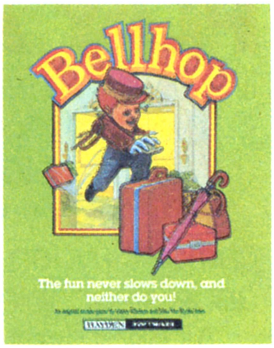
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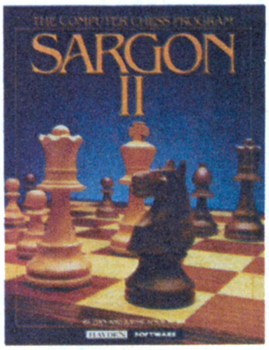
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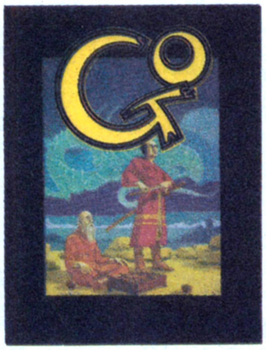

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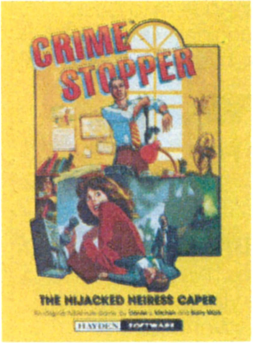
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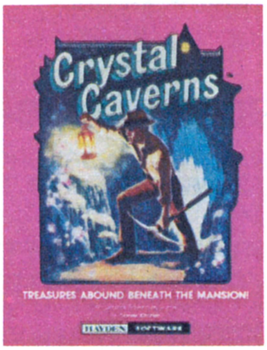
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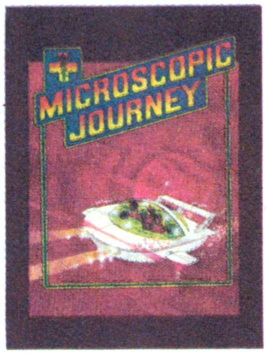
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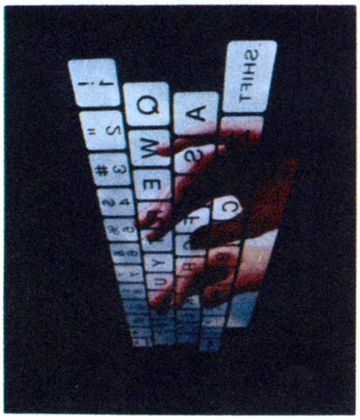

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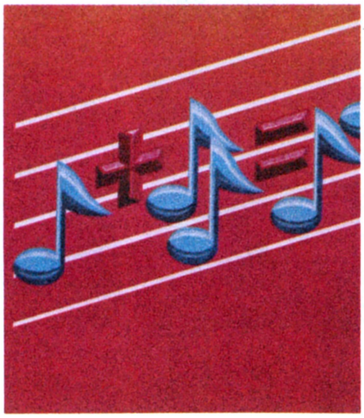

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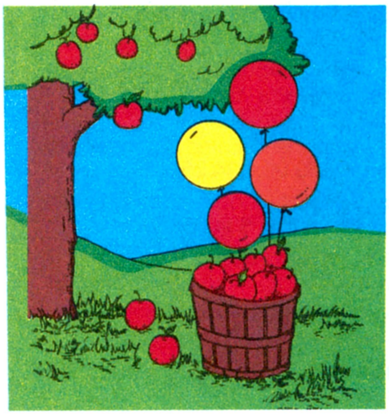

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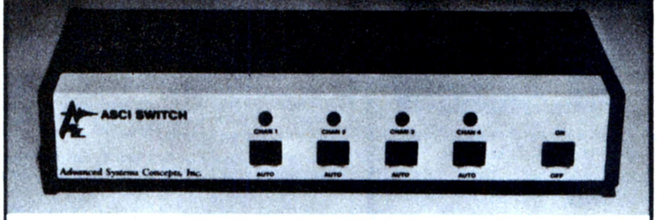

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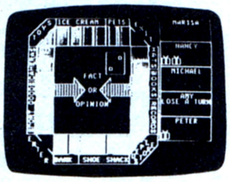

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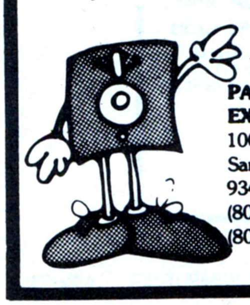

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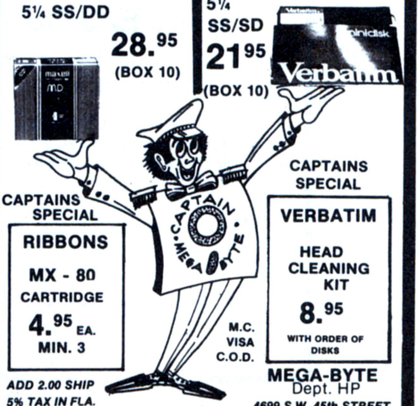

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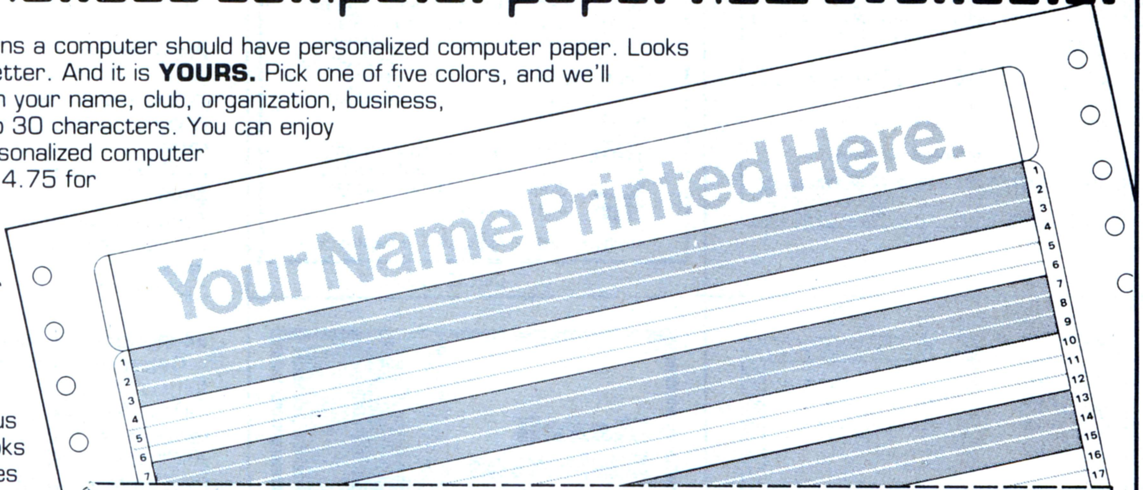
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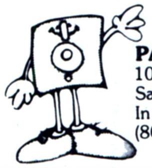

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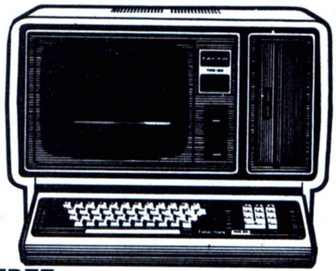

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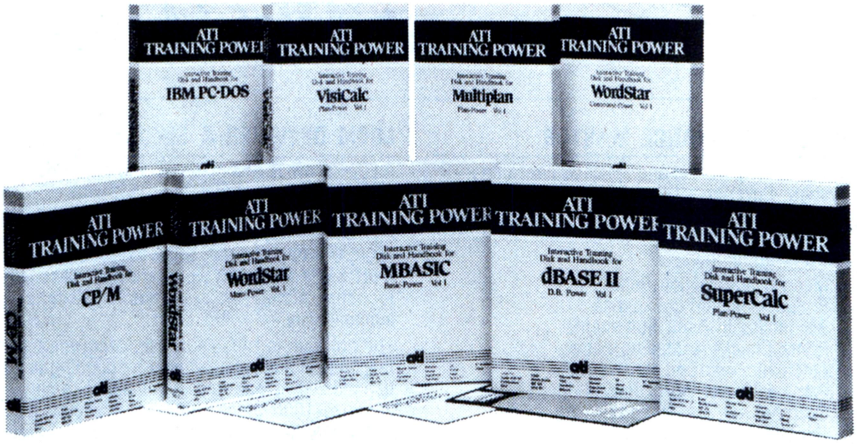

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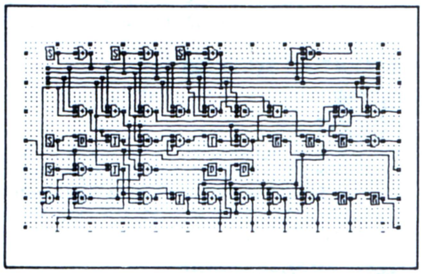

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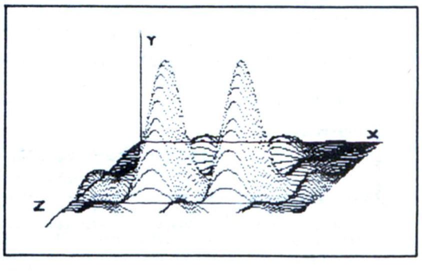

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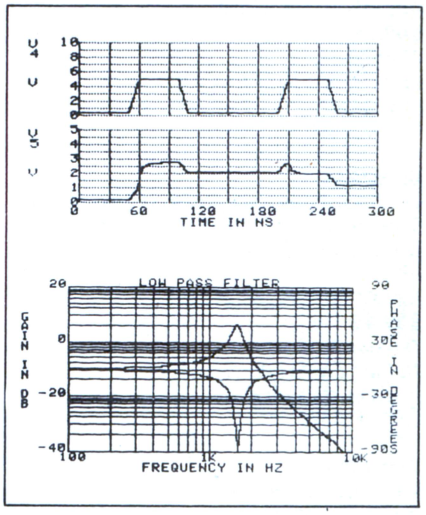

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1 RULE78	Interest Apportionment by Rule of the 78's
2 ANNU1	Annuity computation program
3 DATE	Time between dates
4 DAYYEAR	Day of year a particular date falls on
5 LEASEINT	Interest rate on lease
6 BREAKEVN	Breakeven analysis
7 DEPRSL	Straightline depreciation
8 DEPRSY	Sum of the digits depreciation
9 DEPRDB	Declining balance depreciation
10 DEPRDDB	Double declining balance depreciation
11 TAXDEP	Cash flow vs. depreciation tables
12 CHECK2	Prints NEBS checks along with daily register
13 CHECKBK1	Checkbook maintenance program
14 MORTGAGE/A	Mortgage amortization table
15 MULTMON	Computes time needed for money to double, triple, etc.
16 SALVAGE	Determines salvage value of an investment
17 RRVARIN	Rate of return on investment with variable inflows
18 RRCONST	Rate of return on investment with constant inflows
19 EFFECT	Effective interest rate of a loan
20 FVAL	Future value of an investment (compound interest)
21 PVAL	Present value of a future amount
22 LOANPAY	Amount of payment on a loan
23 REGWITH	Equal withdrawals from investment to leave 0 over
24 SIMPDISK	Simple discount analysis
25 DATEVAL	Equivalent & nonequivalent dated values for oblig.
26 ANNUDEF	Present value of deferred annuities
27 MARKUP	% Markup analysis for items
28 SINKFUND	Sinking fund amortization program
29 BONDVAL	Value of a bond
30 DEPLETE	Depletion analysis
31 BLACKSH	Black Scholes options analysis
32 STOCVAL1	Expected return on stock via discounts dividends
33 WARVAL	Value of a warrant
34 BONDVAL2	Value of a bond
35 EPSEST	Estimate of future earnings per share for company
36 BETAALPH	Computes alpha and beta variables for stock
37 SHARPE1	Portfolio selection model-i.e. what stocks to hold
38 OPTWRITE	Option writing computations
39 RTVAL	Value of a right
40 EXPVAL	Expected value analysis
41 BAYES	Bayesian decisions
42 VALPRINF	Value of perfect information
43 VALADINF	Value of additional information
44 UTILITY	Derives utility function
45 SIMPLEX	Linear programming solution by simplex method
46 TRANS	Transportation method for linear programming
47 EOQ	Economic order quantity inventory model
48 QUEUE1	Single server queueing (waiting line) model
49 CVP	Cost-volume-profit analysis
50 CONDPROF	Conditional profit tables
51 OPTLOSS	Opportunity loss tables
52 FQUOQ	Fixed quantity economic order quantity model
53 FQEOWSH	As above but with shortages permitted
54 FQEOQPB	As above but with quantity price breaks
55 QUEUECB	Cost-benefit waiting line analysis
56 NCFANAL	Net cash-flow analysis for simple investment
57 PROFIND	Profitability index of a project
58 CAP1	Cap. Asset Pr. Model analysis of project
59 WACC	Weighted average cost of capital
60 COMPBAL	True rate on loan with compensating bal. required
61 DISCBAL	True rate on discounted loan
62 MERGANAL	Merger analysis computations
63 FINRAT	Financial ratios for a firm
64 NPV	Net present value of project
65 PRINDLAS	Laspeyres price index
66 PRINDPA	Paasche price index
67 SEASIND	Constructs seasonal quantity indices for company
68 TIMETR	Time series analysis linear trend
69 TIMEMOV	Time series analysis moving average trend
70 FUPRINF	Future price estimation with inflation
71 MAILPAC	Mailing list system
72 LETWRT	Letter writing system-links with MAILPAC
73 SORT3	Sorts list of names
74 LABEL1	Shipping label maker
75 LABEL2	Name label maker
76 BUSBUD	DOME business bookkeeping system
77 TIMECLCK	Computes weeks total hours from timeclock info.
78 ACCTPAY	In memory accounts payable system-storage permitted
79 INVOICE	Generate invoice on screen and print on printer
80 INVENT2	In memory inventory control system
81 TELDIR	Computerized telephone directory
82 TIMUSAN	Time use analysis
83 ASSIGN	Use of assignment algorithm for optimal job assign.
84 ACCTREC	In memory accounts receivable system-storage ok
85 TERMSPAY	Compares 3 methods of repayment of loans
86 PAYNET	Computes gross pay required for given net
87 SELLPR	Computes selling price for given after tax amount
88 ARBCOMP	Arbitrage computations
89 DEPRSF	Sinking fund depreciation
90 UPSZONE	Finds UPS zones from zip code
91 ENVELOPE	Types envelope including return address
92 AUTOEXP	Automobile expense analysis
93 INSFILE	Insurance policy file
94 PAYROLL2	In memory payroll system
95 DILANAL	Dilution analysis
96 LOANAFFD	Loan amount a borrower can afford
97 RENTPRCH	Purchase price for rental property
98 SALELEAS	Sale-leaseback analysis
99 RRCONVBD	Investor's rate of return on convertable bond
100 PORTVAL9	Stock market portfolio storage-valuation program

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Software Assumptions

Your interview with Fred Gibbons on page 43 of the March 1983 issue has prompted me to focus on an assumption commonly made by sellers and buyers, and which continues to lead many small business and professional firms into some very costly and disappointing experiences with computers.

The assumption is that software for word processing, data processing, spreadsheeting, data-base management, vertical markets, etc. are all species of the same grand genus "software," and that accordingly each shares the same underlying economic and performance characteristics. Maybe this assumption holds if one defines software narrowly as the programs encoded on a magnetic medium. To this extent, it is obvious that once the original development and encoding is done, the economics of mass producing additional copies are such that unit prices drop, or at least should drop, as volume rises.

But whether falling prices mean significantly lower real costs to buyers depends on the type of software.

Word-processing software provides an instance where there is normally a close correlation between price paid and real cost to the buyer. The buyer doesn't have to spend much time reorganizing his office before he gets a payoff. He knows what he wants his documents to look like, and it doesn't take him long to figure out whether making them look that way is easy or hard to do on his machine. He knows what he's got in a few hours or days or weeks. And if he likes it, it's a success; if he doesn't, it isn't. Also, he can work largely by himself. "He can," to quote Fred Gibbons, "do what he wants with the computer and has no obligation to use it the way the organization wants him to."

This is all very well for word processing and certain other application areas, but immense damage is being done by letting people assume that the same quick payoffs and personal liberation come from software of all types. The fact is, the correlation between software prices and real costs to buyers really falls apart when it comes to vertical market software aimed at specific business problems. This is also true of some general-purpose accounting software. In these areas, unfortunately, the software price paid is but a small portion of the real costs of getting the benefits—in order to succeed you've got to work very hard and deal with a large number of hidden pitfalls. For example:

- Now that you've got your automated general ledger, you may be surprised to find that you can't tell whether it's working because, alas, you don't really know what a general ledger is supposed to do. That's strange because you didn't have that problem with the word-processing program. Either you're going to have to spend time finding out about accounting on your own, or somebody else is going to have to spend time telling you.
- Inasmuch as you've applied yourself to the problem of converting your business and accounting records to the new system, you're disappointed to find that after two months all you've done is create your client master files. No doubt by this time you've forgotten what the "comprehensive" training session taught you about what to do next.
- Now, after three months of work, you find when you run invoices that you really should have put something in field two rather than in field three of each client master file. You just can't let your invoices go out that way. But the computer's working just fine because when you checked the user's manual you found that, yes, you didn't exactly follow the instructions.

Maybe these are not software problems at all but ones that fall within the purview of training, accounting, or management consulting. Maybe acquiring what's needed in these background areas and knowing what it takes to put a full business system into place are the responsibility of the user. Maybe the level of sophistication among users is growing so rapidly that these problems are just going to disappear on their own. Maybe.

My concern is that in our rush to make a buck from the trend to put personal computers in the office we may be preaching so loudly the gospel of cheaper software that the sounds of the real costs of serious business solutions get muffled until it's too late—until the user gets burned.

It may well be that the anticipated $6 billion software market of 1985 will largely be made up of payments made to clean up the messes of 1983 and 1984.

I'd rather see more bundling of vertical market software with professional training so that the real costs can be made to stand up, be counted, and be managed.

Rodney C. Piette
GILL & PIETTE, INC.
WASHINGTON, D.C.

"Hayden's *Personal Computing* magazine's accuracy policy: to make diligent efforts to insure the accuracy of editorial material. To publish prompt corrections whenever inaccuracies are brought to our attention. Corrections appear in 'Letters.' To encourage our readers as responsible members of our business community to report to us misleading or fraudulent advertising. To refuse any advertisement deemed to be misleading or fraudulent."

GRAPHICS FOR CP/M-BASED MACHINES

You seem to have a knack for telling your readers things I know aren't true. On page 21 of the March 1983 issue, for instance, in the question on why or why not to buy an Osborne, you say: "CP/M 2.2 doesn't support graphics." There are indeed graphics on the Osborne, and some of the games available for it—and for other CP/M-based computers—use graphics heavily.

The Osborne has 32 graphics characters, or 64 including the 32 with underscore. The November issue of *Foghorn*, a monthly newsletter of the First Osborne Group (FOG), carries an ad for Supergraf, a complete graphics editor for the Osborne 1. Supergraf costs $49.95, and is available from ENCON Engineering

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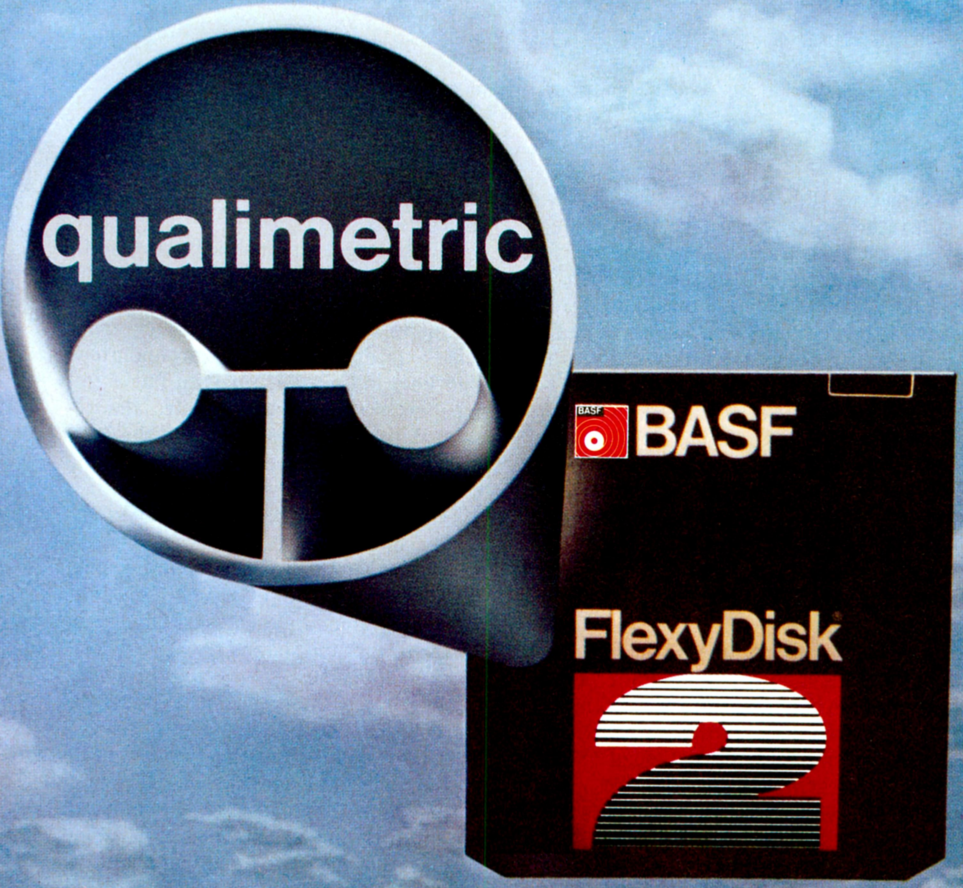

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CIRCLE 129

Consultants, 1885 The Alameda, San Jose, CA 95216.

In addition, there's Easygraf for Epson Graftrax+ and the Osborne 1. It costs $19.95, and can be obtained from SmallSoft, 6808 Estrella Ave., Twentynine Palms, CA 92277. SCRPAINT.BAS is a public domain program available from some Osborne users' groups across the country. It allows you to "paint" a graphics picture on the screen and save the BASIC program required to generate the picture.

Benjamin H. Cohen
CHICAGO, IL

IN COMPUTING, AGE IS NO BARRIER

I sure liked the article "When The Boss Broke The Rules . . ." on page 67 of your March 1983 issue. It reminded me of myself.

I'm 64 years old and just bought my first computer, because it's something I thought I should know about. I especially liked the remark, "The older fellows . . .have done it the hard way for so long that as soon as we recognized the power of the computer, we jumped right on it." Never discount the older guy as "stuck in the mud."

I'm involved in multimedia productions and started working with mini-microprocessors to run 35mm projectors. I've since graduated to Apple computers not only to program and run my projectors, but to do all sorts of things in my photographic lab.

To me, working with computers is like the first time I used a Leica instead of an 8 by 10 camera, or the first time I used an automatic camera instead of an exposure meter. The computer is here to stay and you'd better learn how to use it.

Walter Benson
HARRISBURG, PA

A COMPUTER CLUB SUPPLEMENT

I offer this information to supplement your March 1983 article "The Helping Hands of Computer Clubs" on page 142.

Many Osborne users maintain membership in First Osborne Group (FOG), which is the corporate title of the umbrella organization that maintains the public domain disk library, publishes the newsletter *Foghorn*, and generally lobbies for the customer in addressing Osborne Computer Corporation. It does not speak for the Corporation, but provides a good two-way communications channel between Osborne and its customers, as well as the usual information exchange among users about hardware, utility, applications programs, and idiosyncratic tricks.

There are also many local groups of Osborne users who gather independently to trade information on problems and their solutions, to encourage beginners, and to capitalize on the experience of computer professionals and avid amateur hackers among the members. Many of these groups have adopted a suggested set of bylaws and a minimal organization to the end that they are formally recognized as "Authorized Local FOG Chapters."

The best address for information on Osborne Users' Groups is FOG, P.O. Box 11683-A, Palo Alto, CA 94306.

Byron Davies
PRESIDENT
SAN FRANCISCO FOG

GETTING COMPUTERS INTO THE CLASSROOM

This letter is in response to a letter from Cindy Eusey of Bucyrus, Ohio, which appeared on page 11 of your March 1983 issue.

If Eusey is unsuccessful in her efforts to find funding for a classroom computer, she might consider talking to her fellow teachers to see if anyone shares her concern and enthusiasm.

After wanting a computer for almost two years, and never having the necessary money, I found two partners who were interested in sharing the expense. The economic advantage is obvious. We were able to purchase a system that totally suited our needs—one that none of us could have afforded alone. The computer is located close to all of us, and conflicts of usage rarely occur.

If Eusey could find two or three colleagues willing to split the cost, the entire system could be put onto a portable cart, and an equitable time-sharing arrangement could be worked out. Once the word gets out on the time saving she is realizing, not to mention the increase in student interest and achievement, I feel her fund-raising efforts will improve.

I realize I'm encouraging Eusey to make a personal investment. But it is one that will reap many rewards—not only for her students who will have to face a high-tech work world where computer competence will be expected rather than desired, but for herself as an enlightened and progressive educator who desires to stay in step and remain relevant and effective.

Dwight S. Wilson
BELLFLOWER, CA

PRINTERS FOR THE TRS-80 MODEL III

In your February 1983 Answers column, page 166, you had a question about printers for a TRS-80 Model III with 48k and two disk drives. In your reply you neglected to mention the Smith-Corona TP-1.

While I recognize that the TP-1 is an extremely slow printer, and has a few idiosyncrasies that I've remedied through a small applications program I wrote, it does an excellent job with my TRS-80. I substituted the TP-1 for an IBM Model 75 typewriter and have not regretted the trade. What I lost in speed, I gained in efficiency.

Jim Hunt
BOISE, ID

SOFTWARE FOR THE 64

I found your February answer to "Will There Be Software for the Commodore 64?" interesting (page 13). However, apparently due to lack of information, RSVP, Inc. was not included. I believe we are the first company to offer entertainment software for the 64 as our only product line.

S. Bryan Vaughan
PRESIDENT
RSVP, INC.
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ADDITIONS

The photograph on page 24 of the February 1983 issue of *Personal Computing* was taken by Jake Peters. The photographs beginning on page 211 of the April 1983 issue were taken by Ted Hall.

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CIRCLE 81

Adam Osborne: A Computer Pioneer Talks About The Future Of The Industry

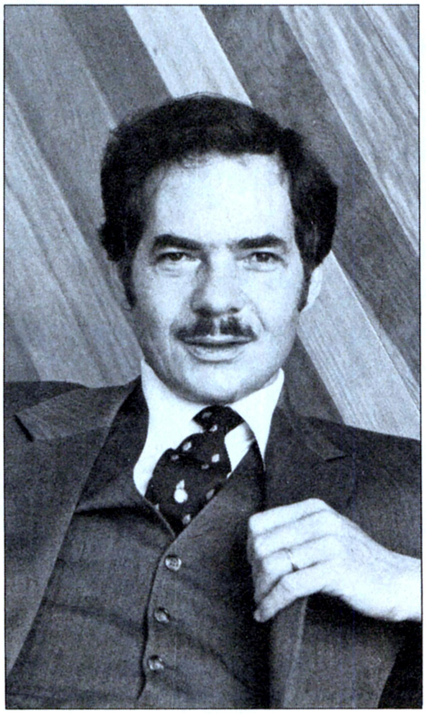
Even if he hadn't seen "a truck-size hole in the market," through which he drove the first portable computer to fame and fortune, Adam Osborne, at 43, would still be a highly recognizable figure in the personal-computer world. His first, self-published book on the subject, An Introduction to Microcomputers, *sold 300,000 copies and enabled Osborne to start his own publishing firm, which was subsequently purchased by McGraw-Hill. At the same time, Osborne's columns, usually provocative and often scathing, were appearing in the computer trade press. The embryonic personal-computer industry clearly wasn't living up to Osborne's standards. But Osborne wasn't content to observe the action from the sidelines: He decided to try his hand at the business himself.*

The result was the Osborne 1, the first portable computer, which took all of four months to design. When it appeared in 1981, offering a complete computer plus a full complement of software for the low price of $1795, it created a sensation. Now, the Osborne has some formidable competitors, both in terms of price and portability. But Osborne got there first, and has reaped the benefits. The Osborne Computer Corporation fills several sprawling buildings in Hayward, California, on the edge of San Francisco Bay. The firm is still growing so quickly that by the time the most recently constructed building was finished, the staff had already outgrown it.

Adam Osborne's role in the company is changing as well. Shortly before Personal Computing *visited, Osborne stepped down as president of the company, relinquishing the role to Robert Jaunich, a seasoned manager with little previous experience in the computer industry. Osborne stays on as chairman of the board, remaining involved in the more technology- and marketing-related aspects of the business.*

At the time of this interview, in early March, Osborne was absorbed with the details of the Osborne Executive, the company's second product, which is reviewed on page 169.

> "*I suspect that 95 percent of all computers sold will never be programmed.*"



photos by Carol A. Foote

You were recently quoted as saying that the future involves "designing and selling computers which people don't realize are computers at all." Can you elaborate on that?

Osborne: We're looking toward the era of the business machine—something you use specifically for word processing and don't think of as a computer. At another desk you'll have a machine you use for financial calculations, and you'll look upon it as a numerical processor. Computers to me are programmable, and I suspect that 95 percent of all computers sold will never be programmed, not even using techniques like The Last One or a data base or anything else. And probably less than 1 percent will get programmed in a programming language. So if you're dealing with 99 percent of the market, why not take out all of that stuff?

And even more so for the home?

Osborne: Yes. There's very little use for a computer in the normal household, outside of business and professional applications.

Yet there is a huge home market projected.

Osborne: Oh, there will be. But not for home computing. It will be for education, entertainment, electronic mail, home security. But take home security—you're not going to have an entire microcomputer sitting somewhere running your security system, any more than you have an electric motor on a concrete slab in the middle of the living room running your refrigerator and washing machine.

In the past, you've suggested that there are areas of society where computers absolutely should not be allowed—banking, elections and the stock exchanges. Have you changed your mind?

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CIRCLE 104

Osborne: Not at all. By chance, I met Donn Parker [Stanford Research Institute expert on computer crime] on a flight to New York last week. And he just reinforced my belief. The problem isn't outsiders attacking the system, it's the insider. As much as you try to put smart security systems in, the smart insider can keep ahead of them.

Yet banks are rapidly expanding the use of electronic fund transfers, and are moving toward home banking as well.

Osborne: The banks claim they know how much they're losing through fraud, and that it's a small amount, and that's the price you pay. My argument is that they have no idea what they're losing—most of the crime they don't know about. By the time they do find out about it, it's too late, and they hush it up.

Donn Parker told me about a recent case of electronic funds fraud, where the bank got together with the embezzler and told him that as long as he moved to Europe and never came back, and never talked publicly about the case, they wouldn't prosecute. And he could keep the money. They were far more concerned with their image than with the amount they'd lost.

You've predicted a disaster on the order of Three Mile Island, involving computers and banking.

Osborne: It's only a question of time before some group—the Mafia, or a foreign country, or just some very bright guys—figures out how to rip off a major bank so they don't know they're being ripped off, until it causes the economic collapse of the unit. All they have to do is keep balancing every theft with a bogus entry, and this can go on until the liquidity of the bank is destroyed—until they realize that the dollar bills are simply not there.

What about computers and employment? Right now we're sitting just north of shut-down Ford and GM plants—yet I don't see many of those unemployed workers getting jobs in electronic assembly plants.

Osborne: While they were dominant, the auto workers got together and managed to obtain artificially high wages, and that's why the auto industry is suffering now. The people doing board-stuffing and testing aren't doing work that is any less demanding than the auto worker on the assembly line, but they're getting paid a lot less, because they're earning what the free market says they should earn.

Another part of it, though, is the increase in automated testing, roboticized assembly, that sort of thing. It's my feeling that intelligent machines will tend to stratify employment—there will be the minimum wage jobs, and then the jobs that require quite a bit of technical background, and very little in between.

Osborne: I believe you're right. In between there will be the leisure and entertainment jobs—that's where everyone else will be. We'll have the technocrats, and I think you're accurate in saying that these people will all have demanding jobs. There will no longer be room for a secretary or a clerk—those people will have to be able to operate very sophisticated business machines built around computers. And before very long, so much of that work can be shifted to the boss, that the boss won't have enough low-level clerical work for a secretary to do. Now we're going a step further and talking about a boss with an assistant, rather than a secretary, where the boss and assistant can do the work that two bosses did previously. And so the number of people employed in business dwindles.

The answer to all this is that if we're smart, and I'm not optimistic that we will be, then we'll have more leisure time and we'll spend that leisure time dealing with people. We won't go to restaurants to be served by automatons. We won't go sailing someplace where machines get the boat ready for you. Wherever we go to spend our leisure time, we'll want to deal with people, and that's where the remainder of society will get its jobs. However, if we don't prepare for it, it won't happen. Instead of a lot of people with leisure time, we'll have a few people with jobs and no leisure time, and a lot of people on welfare.

Obviously, education is a big part of that social transition. Yet, as you've pointed out, in a lot of high-tech situations, qualified teachers aren't going to be around—they'll be in private industry where they can make three times the salary.

Osborne: American education is woefully inadequate. Something needs to be done. The American educational system suffers from being under the autonomy of local school districts, and they follow, rather than lead.

“[In areas involving technology] American education is woefully inadequate.”

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CIRCLE 88

When a smart government runs education, it can look ahead and see that, say, technical education is going to be important. The university can say "Here's what we're looking for in our students," and the government tells the schools to provide it. Here, you have local school boards operating their systems within the limited vision of whatever they happen to understand.

The novel you're writing deals with the ultimate impact of technology on society, and it's not an optimistic view.

Osborne: I think that technology is about to become its own worst enemy. We're rapidly reaching the point where people are beginning to doubt technology. In the 1950s, technology had to make your life better. Now, in the 1980s, people are saying "Wait a minute, is that going to make me wealthier, or is it just going to take away my job?" People aren't going to be that excited by technology, particularly when you see more and more of the present turmoil, which I predict is only going to be worse, because the government can't cope with it. More and more people are going to be negatively impacted by technology.

In some of the Osborne advertising there is a fairly explicit comparison between you and Henry Ford. Do you think history will agree with that parallel?

Osborne: I think it's a valid comparison in that Henry Ford was the first to come along and make the car utilitarian, and I was the first person to come out with what I call the utilitarian computer, which allowed me to drop the price. But the real validity of the comparison 50 years from now is going to depend on the significance of the microcomputer in our daily lives compared with the automobile. Will the microcomputer be as important to daily life 50 years from now as the automobile is today? The probability is that it won't be.

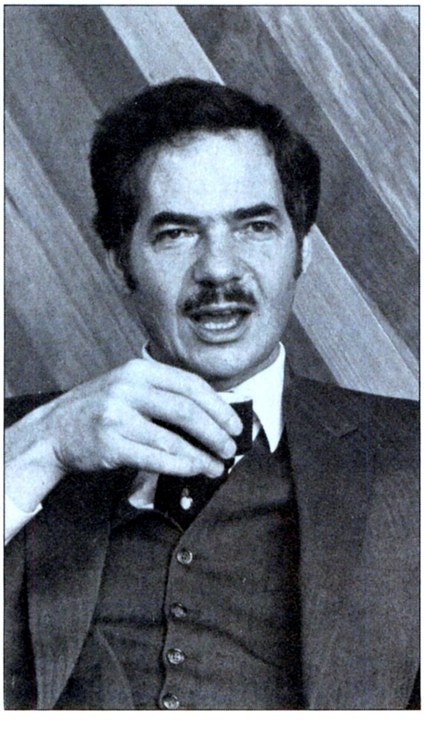
That's interesting. I would have guessed that you'd say it would be as significant as the automobile, or more so.

Osborne: No. Microelectronics will be significant. Microcomputers, not so. Every refrigerator and every washing machine will have a microcomputer in it. There will be—who knows—probably 100 microcomputers in every house, locked away in various electronic control systems. There may be one microcomputer that's being used as a microcomputer, but not as significantly in the daily life of the individual as the automobile.

Where does the new Osborne Executive fit into the personal-computer market? It's a far more crowded field than it was when the first machine came out.

Osborne: It's very evolutionary. It takes all the things the Osborne 1 wasn't and becomes them. For example, I'd always wanted to put both disk drives on the side of the display screen. It's also a little less aggressively priced. From a marketing viewpoint, we're there. We're as well-known as anybody else, so we've got to start attending to profits.

> "I think that technology is about to become its own worst enemy."



The new Osborne, with the 8088 enhancement, is said to be IBM-compatible. What does that mean?

Osborne: It can read IBM diskettes and execute their programs.

A number of new machines claim IBM compatibility, but there seem to be varying degrees of compatibility.

Osborne: Well, you can never be completely compatible because you can't get the IBM ROM chip and put it in your computer. You can get the same entry points, but if anyone is going into native code in order to do anything, then you could get into legal trouble. We don't have color graphics, but we do have the IBM standard bus, and we're compatible to the extent that compatibility is possible.

Compatibility in general—or rather the lack of it—is a subject that drives many personal-computer users crazy.

Osborne: Standardization can't be done by committee because no one ever agrees. Only two things cause standardization: the economic clout of a winner, and law. There's no law; therefore, it's economic clout. In microcomputers, the de facto standard of CP/M as an operating system became evident. But there was no $5\frac{1}{4}$-inch diskette format, so everyone went out and did his own. Now IBM has come along, and it will be a standard. Why? Because IBM is successful, and because they've encouraged people to be IBM-compatible. The people at Apple, on the other hand, are cutting their own throats and painting themselves into a corner they may never get out of. The company is doing everything not to become an industry standard. In effect, Apple's saying "We're going to take on the microcomputing world single-

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handedly." And they're going to lose. They couldn't win against CP/M in 1979 and 1980, when the world belonged to them and Radio Shack. Even with that clout, they couldn't stamp out CP/M. Instead, CP/M came and encroached on their machine. But for some reason they can't see it. Standardization will come. That's why LISA will never make it.

Many commentators seem to see LISA as more of an influence— a milestone—than a viable product.

Osborne: I think that's probably fairly accurate. The concept of LISA is a good one. We all want software that is that easy to use. The problem for Apple is that within a year there will be that kind of software available for both IBM and CP/M-based machines. Apple's advantage will have disappeared and, in the meantime, the high price of the product will have kept it out of its only natural market, which is corporate America. Every Apple salesman has to walk into the corporate suite, where he's never been before, and begin each sales pitch by saying "Let me tell you why you shouldn't buy IBM. . . ."

Was IBM's entry helpful to the personal-computer industry?

Osborne: Very helpful. All of a sudden it burst wide open corporate America as a market. Until then, they weren't quite sure whether the microcomputer was real.

What ever happened to the Japanese invasion of the personal-computer market?

Osborne: I think it eventually may come. They're like IBM—they look carefully, they act slowly, and they do it right. They haven't done it yet. In my opinion, they've been too busy addressing their domestic market, which is huge. And we're really fortunate that they have Kanji, the Japanese character set, over there, because they're busy making machines that work in Kanji. This means that their machines have so much extra hardware we don't need in America, that they're not competitive here.

Do you ever find yourself surprised, when you walk around here and see what kind of corporation has grown up in only three years?

Osborne: It's kind of awesome in a way, I suppose, but you know, it's like everything else—it always appears more awesome from the outside than from the inside. From the inside, you're so cognizant of the problems you encountered getting there, and the problems you're encountering now that you're there.

Was it difficult for you to step down as president of the company?

Osborne: Not at all.

For some entrepreneurs, that's the main failure mode.

Osborne: Exactly. As long as what they're good at is good for the company, they'll do well. That lasts for a short, high-growth period when the company is still so small that by just meeting in the corridor you find out what's going on. But that doesn't last long. All of a sudden you find you need management. And there, a lot of entrepreneurs are doubly handicapped, for many of them were rejects from large corporations because they couldn't cope with management. So they go out, become successful entrepreneurs, and attack that which they didn't like—the kind of large company they got thrown out of. But all they succeed in doing is hurting themselves. Entrepreneurs are very ego-driven. You have to be, or you could never do the stupid things you have to do to succeed. But successful entrepreneurs are pragmatic as hell. At some point they realize that their own egotism is going to get in the way, and they should quit right there if they want to remain successful.

"By 1990, people just won't accept what we're selling today."

Has this company satisfied your entrepreneurial instincts? Can you imagine another field capturing your interests in a similar way?

Osborne: Oh, definitely. Right now, my wife and I—mostly my wife—are about to launch a new popular music group. We're backing a New Wave band, and they're going to be right up there with the Rolling Stones in three or four years.

Overall, has the consumer been well-served by the first few years of the personal-computer industry?

Osborne: The consumer always has some problems to begin with in any new business. I like old cars; they're one of my hobbies. I had a 1948 Packard, and I have a 1940 Packard. I had a 1948 Packard because I tried to drive it on more than occasional outings. You only have to look at automobiles to realize that products that were acceptable in the past are totally unacceptable today. The same is true with our industry, only it's telescoped in time. By 1990, people just won't accept what we're selling today.

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Thousands of dollars worth of word processing performance for just $149.95

Who's saying that?

Arthur Naiman, for one, in the "Word Processing Buyer's Guide" to be published soon by McGraw-Hill.

In his definitive study, Naiman compared 14 major word processing products—and PIE:Writer was among the top three. Its nearest neighbors were dedicated word processors which cost from $13,500 to $15,000. (See a portion of the study results below.) Yet PIE:Writer can be part of your personal computer system for just $149.95!

So now your business or home microcomputer can have capabilities equivalent to the industry's top machines. Naiman says:

> **"PIE:Writer, running on a humble Apple II, outscored every other word processing program for microcomputers . . . (It) crams an incredible amount of power into a small (23½ K) and inexpensive package . . . PIE:Writer beat four out of six dedicated word processors."**

	Operating system(s) and/or machine(s)	Price	Overall Score
CPT 8100	dedicated word processor*	$15,000	94¾
Dictaphone Dual Disp.	dedicated word processor*	$13,500	85¼
PIE:Writer:	**Apple II, IBM PC**	**$149.95 $199.95**	**84¼**
A.B. Dick Magna SL	dedicated word processor*	$14,500	83
Write	CP/M†	$400	82¼

No other microcomputer word processor earned the ranking that PIE:Writer did. PIE:Writer can make your personal computer into a word processing whiz.

That's not all.

PIE:Writer has been steadily collecting honors from experts throughout the industry for its all-around price/performance and its many advanced user features.

When Peelings II magazine compared 10 micro word processors, PIE:Writer came out on top . . . again. Peelings II rated PIE:Writer "AA + " and defined the rating as ". . . top notch, superb." The review concluded:

> **". . . a formidable contender in performance to price ratio . . . PIE:Writer is hard to beat."**

And Interface Age said in an in-depth review of PIE:Writer's current version:

> **". . . much has been gained in this update to a time-tested classic."**

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Why the experts love PIE:Writer.

Why all the fuss?

Here are some of the features reviewers chose as the basis for PIE:Writer's excellent performance, and the reasons why you should choose PIE:Writer:

PIE:Writer is fast in executing functions such as search, scroll, page up and down.

PIE:Writer is easy to learn, with an excellent new set of user documentation.

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PIE:Writer can edit either text or programming code.

PIE:Writer is compatible with a wide range of hardware.

And reviewers note that PIE:Writer has refined the most sought-after editing features:

- ✓ wrap/columnar option
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- ✓ justify right and left
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- ✓ control page breaks
- ✓ cut and paste
- ✓ "Help" screen
- ✓ forward & backward page scrolling
- ✓ automatic centering
- ✓ full format control
- ✓ control page numbering, bottom and top headers
- ✓ underlining
- ✓ tabbing by word or moveable marks

You'll love PIE:Writer too.

You'll find everything you need in PIE:Writer. Whatever you write will be easier to do: reports, letters, books and articles, memos and personal notes. Use PIE:Writer with a 40 or 80 column set-up, lower case adapters, hard disks, modems or shift-key modifiers. PIE:Writer works with spelling checkers, Visi Calc* files and can edit program source files.

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The experts use words like "powerful," "clean," "formidable" and "graceful" to describe PIE:Writer. But don't take their words for it. Try PIE:Writer yourself and enjoy the ease and excitement of the top-ranked word processor.

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There's another significant reason to love PIE:Writer: it's backed by Hayden Software, a company with the experience and resources to provide solid products, thorough, user-friendly documentation, and full technical support.

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The Future Of Computing: Personal With A Capital P

Computers won't take us through the frontier of the future. Computing will. It's not the machines, but the minds behind them that make the difference

by Paul Kellam, Editor, Personal Computing

When the editors of *Time* magazine put a personal computer on their man-of-the-year cover they were certainly headed in the right direction. But they failed to draw the distinction for their readers between human minds and mere machines. As a consequence, they added to the general confusion over the significance of *personal* computing.

Although words on *Time's* inside pages offered some clarification, neither *personal* nor comput*ing* was joined in a central theme. So it's not surprising that the important distinction between computers in general and personal computing in particular was lost on quite a few *Time* readers.

Time senior writer Frederick Golden was right on when he wrote: "Computers were once regarded as distant, ominous abstractions, like Big Brother. In 1982 they truly became personalized, brought down to scale, so that people could hold, prod and play with them."

And *Time* writer Roger Rosenblatt was right on when he wrote: "Computers save time. Time is money and time is dreams. . . . Our forefathers wanted land. Machines opened the territory, then closed it down. But the land was never our real territory. The dream was our real territory."

Those paragraphs, unfortunately, only hint at the significant point to

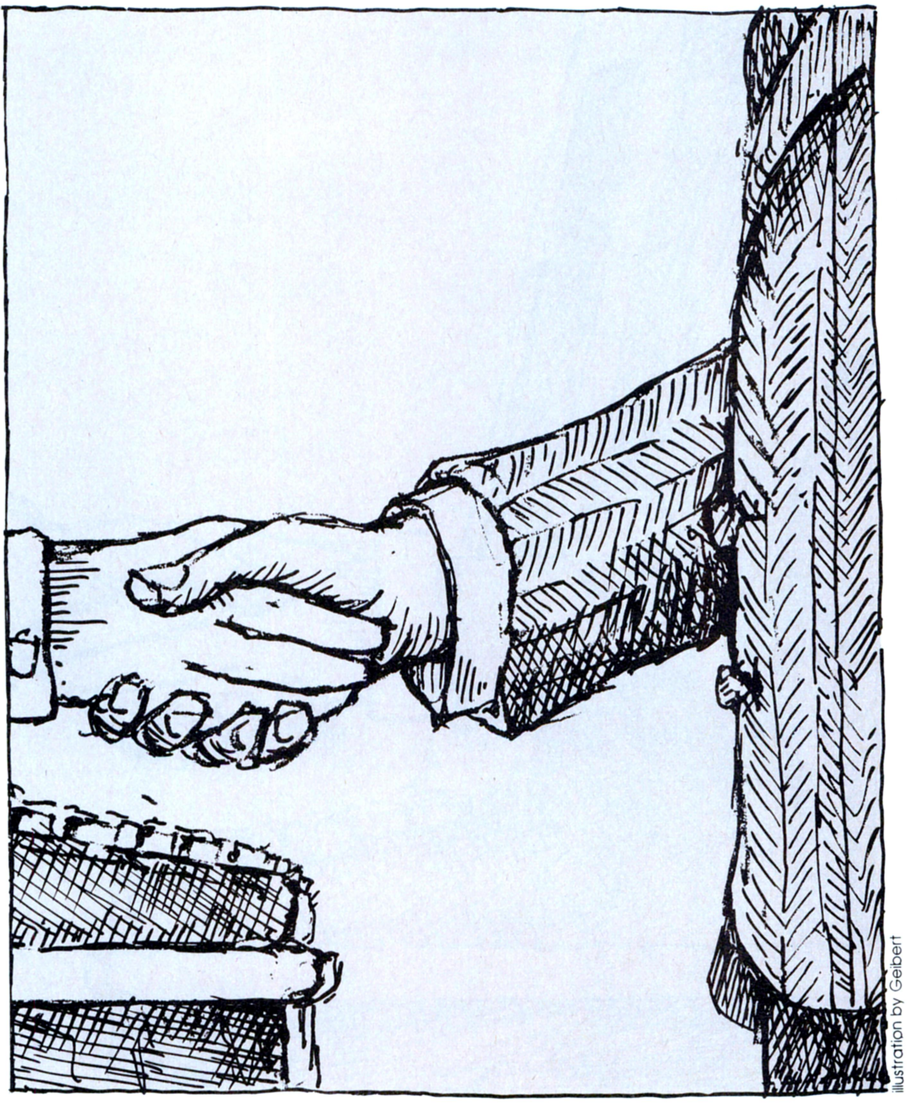


illustration by Geibert

Personal computing is our vehicle for the frontier of the 1980s.

be made: Personal computing is our vehicle for the frontier of the 1980s, for the frontier of the future. It gives us unparalleled new capacity to dream—to occupy our real territory, and to occupy that territory as individuals.

Time reader response in a later issue reflected a fear of computers in general, a perception of them as heartless machines likely to institutionalize persons, instead of levers for individual human minds that give individuals the ability to personalize institutions.

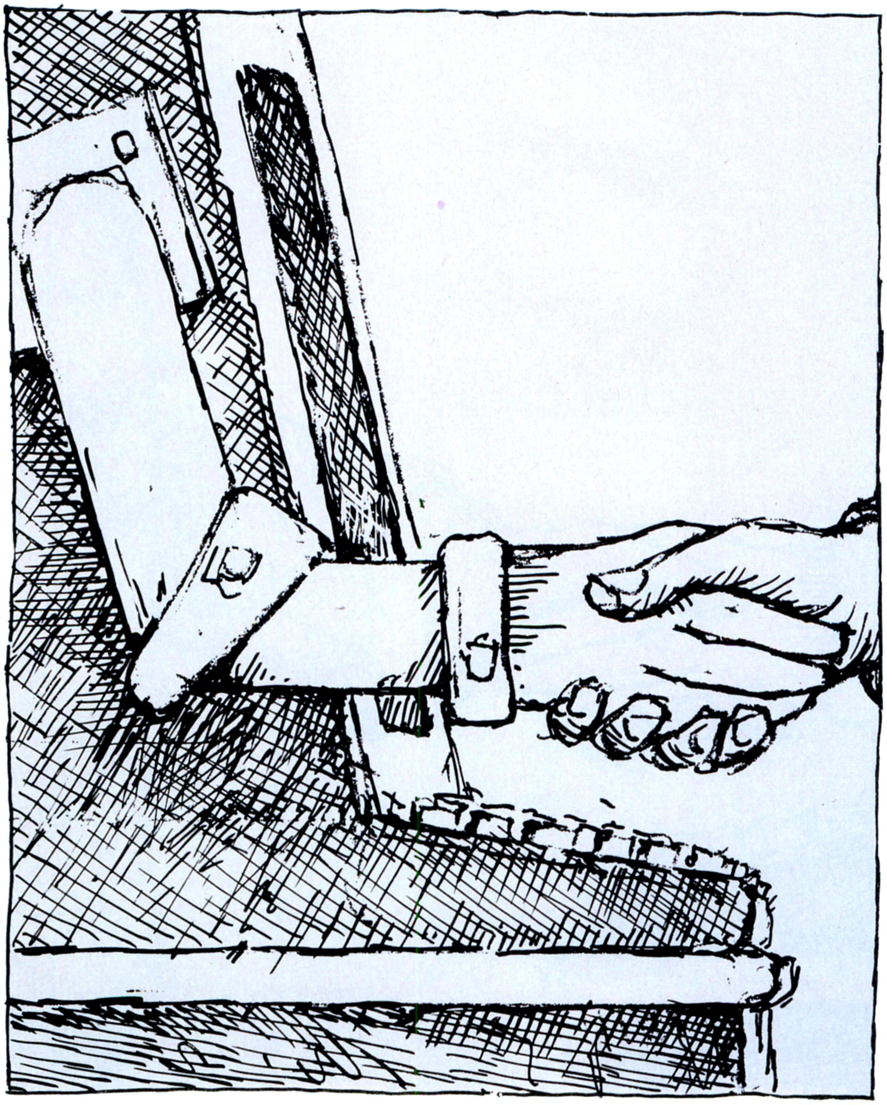
"The computer is a marvelous machine, but it will never replace man. . . ." one reader wrote. Of course it won't. As a personal tool personal computing enables individuals to realize their full potential.

"I fear computers will start World War III by mistake," wrote another reader. "They now make errors on income tax, bank statements and utility bills. These machines have no conscience."

Of course they have no conscience. Those are institutional machines. Institutions have only a corporate conscience. Personal computers have no conscience either, in themselves, but as extensions of individual human minds they are tools for extending those minds and tools for extending the conscience of the individual. As personal tools they give individuals the power to cope with institutional might and wrongs.

"The human mind is more creative than any computer," wrote another reader. "Machines can be bought and sold, the human mind cannot."

Exactly! That's why the distinction between institutional and personal is so important. Another reader said it, but missed the "personal" point. "Your selection of a computer is a copout," he wrote. "It takes a person to run a computer." Of course; that's the point.



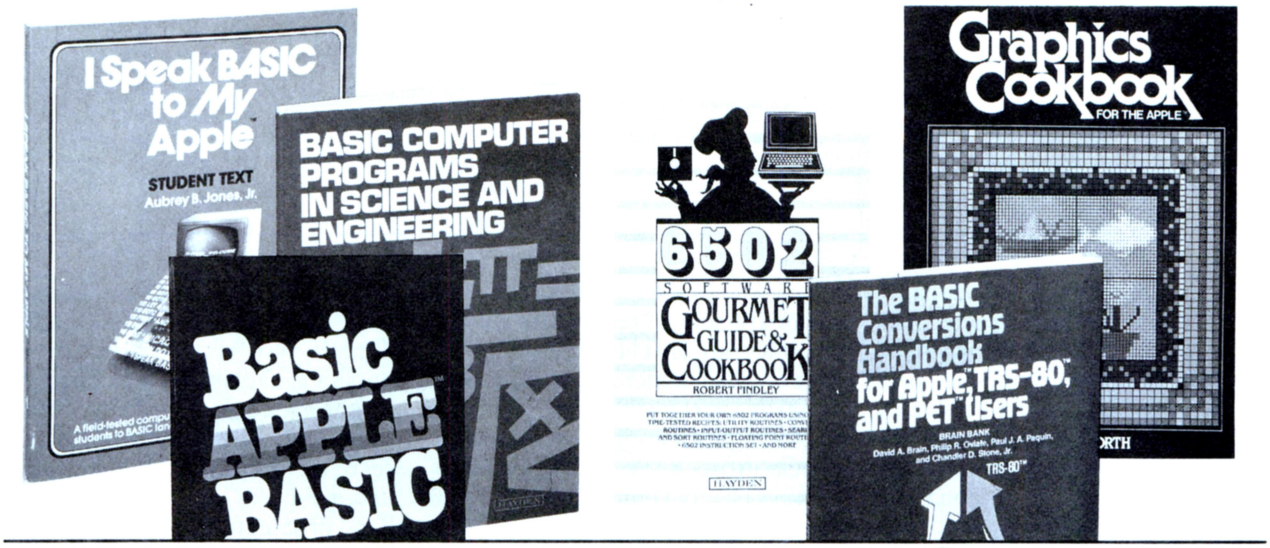
Vital distinctions

Another reader wrote: "*Time* pictured computers in a shopping center, office, farm, classroom and home. However, you failed to show the room where new orders, renewals, payments and cancellations are fouled up." Again, the important distinctions of *personal* and comput*ing* were missed.

There are computers, and there are computers. As machines they have injected both threat and promise into this age of The Cognitive Revolution in which we live. The crucial distinction between threat and promise lies in an understanding of the meaning of the word "personal." It is not the size of the machine that makes it personal. It is not where the machine is located (home or office) that distinguishes it and makes it personal. It is not even who owns the system that matters.

Rather, it is who has made the decision to use the computer and what it's used for that matters. Personal computing means *you* have made the decision to use a powerful mental tool to enhance *your own* personal productivity, to gain *your own* personal competitive edge.

Hayden


I Speak BASIC to My Apple
STUDENT TEXT
Aubrey B. Jones, Jr.
BASIC COMPUTER PROGRAMS IN SCIENCE AND ENGINEERING
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This understanding of "personal" is important to us here at *Personal Computing* magazine. It's the use of the system that determines its personalness—not the machine's size or its ownership. And that's a distinction that can become quickly blurred it it's not thoroughly understood.

Institutional vs. personal

Can an institutional machine become personalized? Yes, it can, and often does. Let's say you have a desktop-size computer imposed upon you by the management of the place where you work. You are given this tool to use for a specific task—managing a data base, for example. We would call that an institutional use at the outset, but it's likely to become personalized, and frequently does.

Why? Because the injection of the computer into the equation of getting a task done frequently does far more than merely mechanize or automate that task. The automation is merely the most immediate and obvious productivity gain. At that point the computing is still institutional.

If a mainframe computer is the automating tool the computing is likely to *remain* institutional. But if the automating tool is a personal-size computer in the hands of an individual who is looking for ways to enhance his own personal productivity, then something far more significant than mere automation is likely to occur. The *task itself* is likely to be changed by the computing person.

At that point the system that started out institutional becomes personalized. The individual user of the system has used it to enhance his own personal productivity, to gain his own personal competitive edge.

Inevitable change

Adam B. Green explains the process this way in his book, *dBASE II User's Guide:* "One factor to count on in any computer application is change. A common saying in the computer field is that 'any program which is running is obsolete.' . . . There are several reasons for this inevitable change. The users will rarely have a good understanding of their existing manual systems, which makes implementing a computerized system difficult. Secondly, the introduction of any computer system will cause the users to change their view of the computer's capability. One common request is, "if it can do that, can't it also do this one little extra function? These little extras can keep a project going forever."

In outline, what goes on is something like this: Manual task is out of hand. Computer is acquired to automate manual task. Automating manual task requires thorough study of it in order to adapt it to computer. Study of task and automation of it reveal inefficiencies, which are improved upon.

Simultaneously, automation of the task reveals capabilities of the computer that were not previously understood. So the task is further streamlined to adapt to the computer capabilities.

And the process goes on. It would not likely go on—at least not to the same extent—in the case of a data-processing department in charge of automating the task. In the case of an individual with imagination and competitive drive, however, the computer becomes a tool for personal efficiency gains.

Can personal computing become institutionalized? Of course. It often does, and that's not all bad.

Let's say you acquire a system for the purpose of automating inventory control in your business, for example. You automate the task and streamline the process to the point where you're satisfied with it. Then you turn the whole thing over to someone else to operate and you go on to other non-computer business concerns.

If everything stops there then that's a personal use turned institutional. The computer is in the same class as a copying machine or a delivery truck. What often happens, however, is that a new personal use derives out of the experience in pursuing the initial objective. The inventory control becomes institutionalized, but the computer, or a second computer, is then put to *another* task—project planning, perhaps, or sales forecasting, or financial management.

Getting hooked on the potential

This is the magic of *personal* computing. Once people get introduced to *personal* computing they get hooked on it. They don't get hooked on the intricacies of the hardware and software, although that can be fascinating in itself. They do get hooked on the pursuit of what else *personal* computing can do for them. They find out how to save time. Time is money and time is dreams. And the dream is our territory of the future.

It is the reality of a way available now to make personal dreams come true that makes this time in which we live truly revolutionary. The Industrial Revolution is rapidly losing steam. The new revolution—The Cognitive Revolution—is heating up fast.

It has been said that the essentials for civilization are:

- Self-confidence,
- Hopefulness,
- Expectation of one's ability to exert some control over one's destiny,
- Knowledge and the means to acquire it and pursue it . . . and
- Love—i.e., the capacity to be concerned for others, the resources to be able not to be fully occupied with the basics of food, clothing and shelter, the ability to rise above self concern.

It might be said that all of these essentials are embodied in a sense of posterity—the ability to look beyond today, to look even beyond one's lifetime, forward to a vision of and concern about the future.

The Cognitive Revolution is inevitable, we submit, because the power of *personal* computing gives individ-

Personal computing will sweep forward quickly and give us power.

uals a huge leg up on those ingredients of life that are the essentials of civilization.

There is no question but that personal computing breeds self-confidence as individuals are better able to gather, organize, and analyze facts, and thus gain knowledge. You might call it the ability to get on top of things.

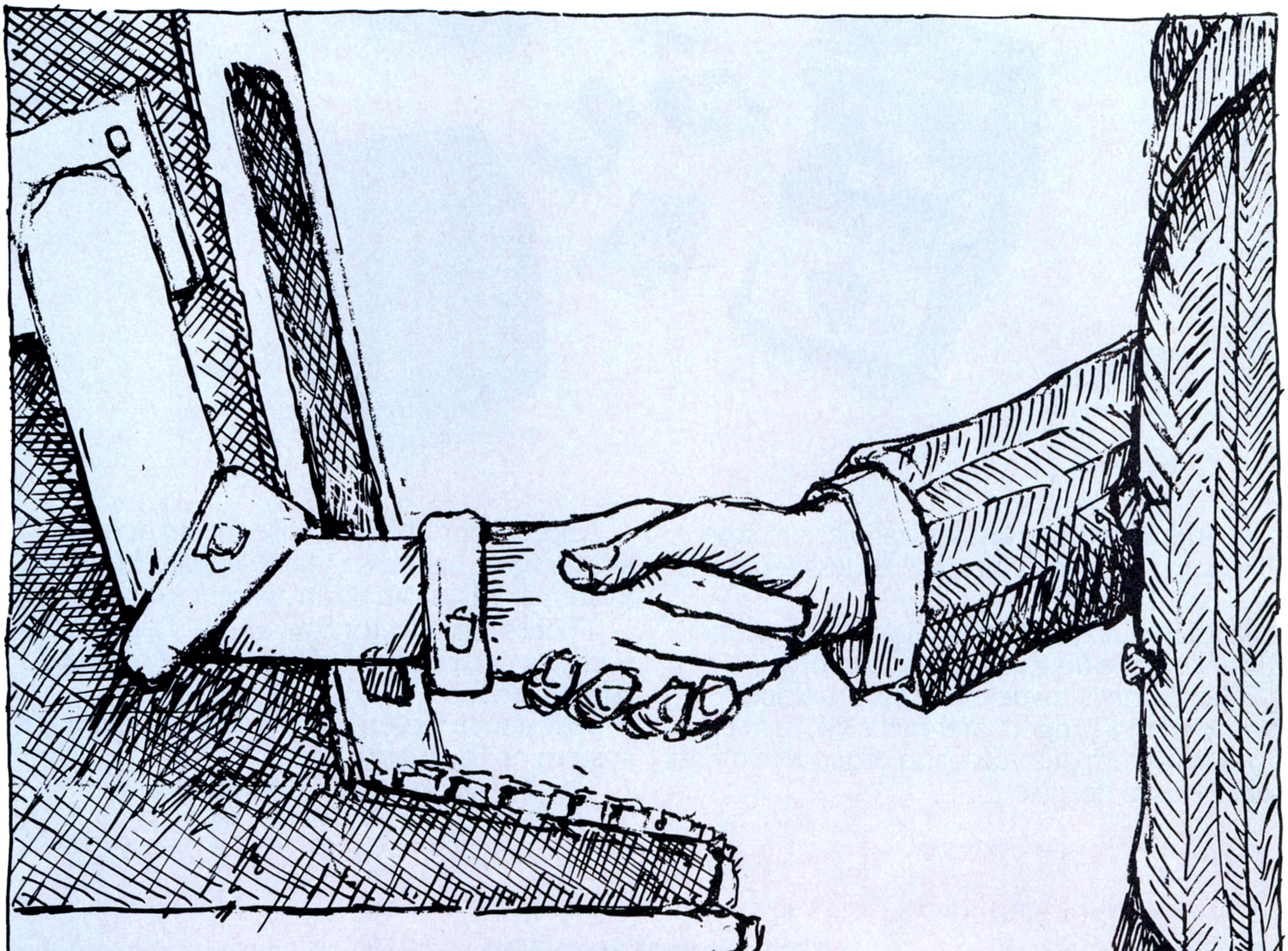
Being on top of things generates hopefulness and expectation of one's ability to exert some control over one's destiny. And that makes room for love.

Despite fear of computers—computerphobia—as with most things new, The Cognitive Revolution is inevitable, because our real territory is our dreams and *personal* computing gives us the ability to make our dreams come true.

We have just begun. Personal computing is still in the Model-T-Ford stage of development. Personal computing will sweep forward quickly and give us personal power that we cannot even imagine today.

And perhaps that's the real root of the fear. More than a fear of the machine is a sense of insecurity as to one's ability to deal with the future. Personal computing will inevitably alter the status quo, as machines did, but in ways that machines never did.

For man's mind is limitless, constrained only by its ability to engage the environment in which it finds itself. As that ability is leveraged by individuals the results personally and internally will be akin to colonization of the planets, if you want to look ahead, or akin to invention of the wheel, if you want to look to the past.



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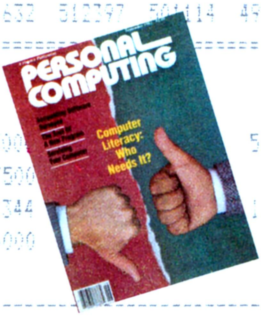

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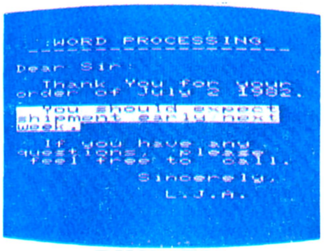
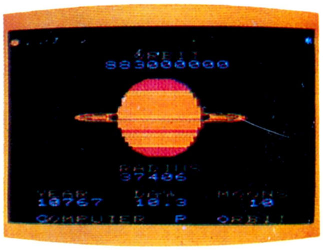
CIRCLE 107

IF YOU OWN A COMMODORE COMPUTER, YOU KNOW IT CAN DO ALL THIS.

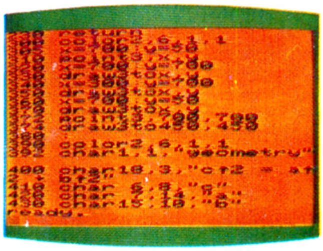


```
:WORD PROCESSING
Dear Sir:
  Thank You for your
order of July 2 1982.
  You should expect
shipment early next
week.
  If you have any
questions, please
feel free to call.
        Sincerely,
          L.J.A.
```

BUSINESS

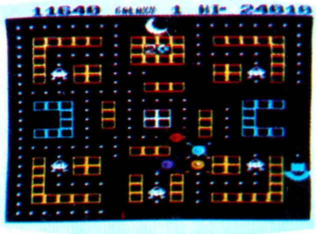


EDUCATION



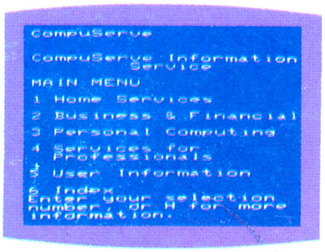
```
return
color2,6,1,1
x=700:y=50
point3,x,y
x=700:y=700
draw3tox,y
x=300:y=700
draw3tox,y
x=700:y=50
draw3tox,y
point3,700,700
draw3to450,450
color2,6,1,1
char1,1,"geometry"
400 char18,3,"c↑2 = a↑
2 + b↑2"
410 char 6,8,"c"
420 char 7,14,"a"
430 char15,18,"b"
ready.
```

PROGRAMMING



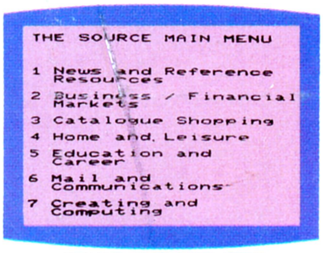
GAMES

BUT DID YOU KNOW FOR ABOUT $100, YOU CAN ALSO GET IT TO DO ALL THIS?



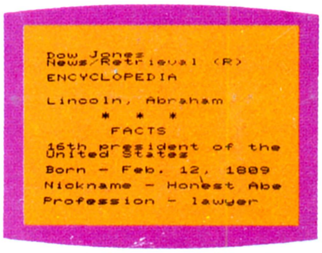
```
CompuServe

CompuServe Information
       Service
MAIN MENU
1 Home Services
2 Business & Financial
3 Personal Computing
4 Services for
  Professionals
5 User Information
6 Index
Enter your selection
number, or H for more
information.
```

COMPU SERVE™



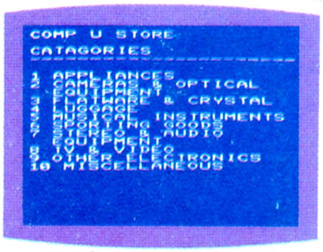
```
THE SOURCE MAIN MENU

1 News and Reference
  Resources
2 Business / Financial
  Markets
3 Catalogue Shopping
4 Home and Leisure
5 Education and
  Career
6 Mail and
  Communications
7 Creating and
  Computing
```

THE SOURCE℠



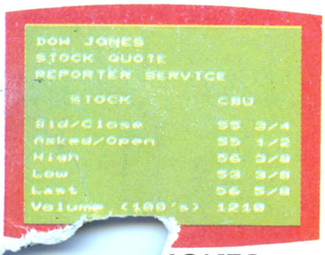
```
Dow Jones
News/Retrieval (R)
ENCYCLOPEDIA

Lincoln, Abraham
     *   *   *
       FACTS
16th president of the
United States
Born - Feb. 12, 1809
Nickname - Honest Abe
Profession - lawyer
```

ENCYCLOPEDIA



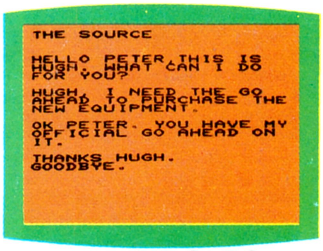
```
COMP U STORE
CATAGORIES
------------------------
1 APPLIANCES
2 CAMERAS & OPTICAL
  EQUIPMENT
3 FLATWARE & CRYSTAL
4 LUGGAGE
5 MUSICAL INSTRUMENTS
6 SPORTING GOODS
7 STEREO & AUDIO
  EQUIPMENT
8 TV & VIDEO
9 OTHER ELECTRONICS
10 MISCELLANEOUS
```

SHOP AT HOME



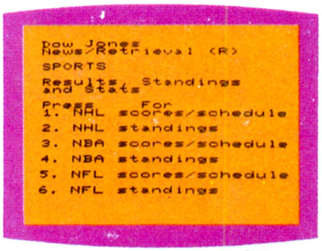
```
DOW JONES
STOCK QUOTE
REPORTER SERVICE

   STOCK           CBU

Bid/Close          55 3/4
Asked/Open         55 1/2
High               56 3/8
Low                53 3/8
Last               56 5/8
Volume (100's)     1210
```

JONES RETRIEVAL



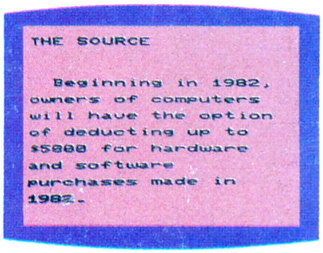
```
THE SOURCE

HELLO PETER,THIS IS
HUGH. WHAT CAN I DO
FOR YOU?

HUGH, I NEED THE GO
AHEAD TO PURCHASE THE
NEW EQUIPMENT.

OK PETER. YOU HAVE MY
OFFICIAL GO AHEAD ON
IT.

THANKS HUGH.
GOODBYE.
```

ELECTRONIC MAIL



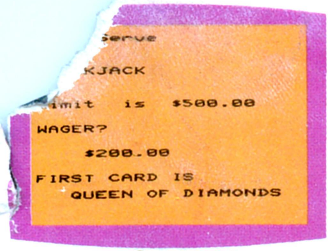
```
Dow Jones
News/Retrieval (R)
SPORTS
Results, Standings
and Stats
Press     For
1. NHL scores/schedule
2. NHL standings
3. NBA scores/schedule
4. NBA standings
5. NFL scores/schedule
6. NFL standings
```

WIRE SERVICE NEWS



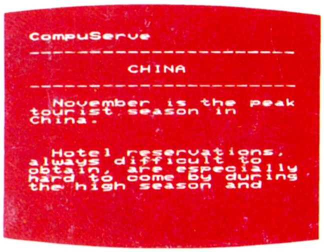
```
THE SOURCE

  Beginning in 1982,
owners of computers
will have the option
of deducting up to
$5000 for hardware
and software
purchases made in
1982.
```

TAX ADVICE



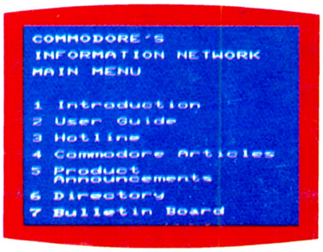
```
Serve

KJACK

imit  is  $500.00

WAGER?

    $200.00

FIRST CARD IS
   QUEEN OF DIAMONDS
```

GAMES



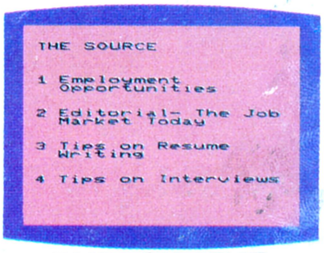
```
CompuServe
------------------------
         CHINA
------------------------
  November is the peak
tourist season in
China.

  Hotel reservations,
always difficult to
obtain, are especially
hard to come by during
the high season and
```

TRAVEL INFORMATION



```
COMMODORE'S
INFORMATION NETWORK
MAIN MENU

1 Introduction
2 User Guide
3 Hotline
4 Commodore Articles
5 Product
  Announcements
6 Directory
7 Bulletin Board
```

COMMODORE INFO. NETWORK



```
THE SOURCE

1 Employment
  Opportunities

2 Editorial- The Job
  Market Today

3 Tips on Resume
  Writing

4 Tips on Interviews
```

EMPLOYMENT OPPORTUNITIES

The screens at the top of the page show a few examples of how versatile the VIC 20™ or Commodore 64™ can be with the addition of Commodore software.

The screens below them give you a few examples of how much more versatile they can be with the addition of a Commodore VICMODEM.

For around $100, the Commodore VICMODEM will turn your VIC 20 or Commodore 64 computer into a telecomputer.

To make matters even better, Commodore includes a few little extras (such as a free hour's time on the two most popular telecomputing services) that add up to a value of $197.50.* A nice return on an investment of about $100.

Most computer companies think it's reasonable to ask as much as $500 for a modem that'll give you telecomputing capabilities such as ours.

However, with a VICMODEM priced at around $100, we think we're being a lot more reasonable. Don't you agree?

commodore COMPUTER

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CIRCLE 89